MARY D. ROGICK

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Natural History of Victoria
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Natural History of Victoria.

PRODROMUS

OF THE

ZOOLOGY OF VICTORIA;

OR

FIGURES AND DESCRIPTIONS OF THE LIVING SPECIES OF ALL CLASSES

OF THE

VICTORIAN INDIGENOUS ANIMALS.

VOLUME II.

(*DECADES XI. TO XX.*)

BY

FREDERICK McCOY, C.M.G., M.A., Sc. D. CANTAB., F.R.S.,

HONORARY MEMBER OF THE CAMBRIDGE PHILOSOPHICAL SOCIETY; HONORARY ACTIVE MEMBER OF THE IMPERIAL SOCIETY OF NATURALISTS OF MOSCOW; CORRESPONDING MEMBER OF THE ZOOLOGICAL SOCIETY OF LONDON; HONORARY MEMBER OF THE ROYAL SOCIETY OF NEW SOUTH WALES; HONORARY MEMBER OF THE NEW ZEALAND INSTITUTE; HONORARY FELLOW OF THE GEOLOGICAL SOCIETY OF EDINBURGH; HONORARY MEMBER OF THE GEOLOGICAL SOCIETY OF MANCHESTER,
ETC., ETC., ETC.
AUTHOR OF "SYNOPSIS OF THE CARBONIFEROUS LIMESTONE FOSSILS OF IRELAND;" "SYNOPSIS OF THE SILURIAN FOSSILS OF IRELAND;" "CONTRIBUTIONS TO BRITISH PALÆONTOLOGY;" ONE OF THE AUTHORS OF SEDGWICK AND McCOY'S "BRITISH PALÆOZOIC ROCKS AND FOSSILS;" "PRODROMUS OF THE PALÆONTOLOGY OF VICTORIA," ETC.

PROFESSOR OF NATURAL SCIENCE IN THE MELBOURNE UNIVERSITY.
GOVERNMENT PALÆONTOLOGIST, AND DIRECTOR OF THE NATIONAL MUSEUM OF MELBOURNE, ETC.

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1885

ADVERTISEMENT.

It having been considered desirable to ascertain accurately the natural productions of the Colony of Victoria, and to publish works descriptive of them, on the plan of those issued by the Governments of the different States of America, investigations were undertaken, by order of the Victorian Government, to determine the Geology, Botany, and Zoology of the Colony, to form collections illustrative of each for the public use, and to make the necessary preparations for such systematic publications on the subject as might be useful and interesting to the general public, and contribute to the advancement of science.

As the geological and botanical investigations have already approached completion, and their publication is far advanced, it has been decided now to commence the publication of the third branch completing the subject, namely, that of the Zoology or indigenous members of the different classes of the animal kingdom.

The Fauna not being so well known as the Flora, it was a necessary preliminary to the publication to have a large number of drawings made, as opportunity arose, from the living or fresh examples of many species of reptiles, fish, and the lower animals, which lose their natural appearance shortly after death, and the true characters of many of which were consequently as yet unknown, as they had only been described from preserved specimens. A Prodromus, or preliminary issue, in the form of Decades, or numbers of ten plates, each with its complete descriptive letterpress, will be published, of such illustrations as are ready, without systematic order or waiting for the completion of any one branch. The many good observers in the country will thus have the means of accurately identifying various natural objects, their observations on which, if recorded and sent to the National Museum, where the originals of all the figures and descriptions are preserved, will be duly acknowledged, and will materially help in the preparation of the final systematic volume to be published for each class when it approaches completion.

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M DCCC LXXXV.

PREFACE.

This eleventh Decade gives illustrations in the first plate, No. 101, of the only Victorian specimen known of the great Luth, or Leathery Turtle, the largest of the living Chelonians, and certainly identical with the Old World and American examples.

The second plate, 102, gives the first recognisable figure of one of the most extraordinary of Australian Lizards, the Rugged Stump-tail, or Shingle-back, Lizard; the short head-like tail, and very large, thick, rugged scales of which suggest two of the popular names given to it.

The next plate, 103, shows one of what I venture to call our "Worm-Snakes," the *Typhlops nigrescens*, which burrows in the light soils of the warm northern part of the colony, and is often found in ants' nests.

The fourth plate, 104, is of great interest, not only as giving the first accurate figure of the most famous of all Sharks, the Basking Shark, the largest of all known fishes (upwards of thirty feet long), but as representing the only recorded occurrence of the species south of the Equator. The food has now for the first time been identified with certainty as a very minute Pteropodous

Mollusc *Cuvieria minor* (McCoy), less than the twelfth of an inch in length; reminding one of the similarly minute food of many Whales.

The next four plates continue the illustrations of Victorian Polyzoa, the descriptions and type specimens of which have been given by Mr. MacGillivray for this work and the National Museum.

Plate 109 illustrates the largest species of the group of Insects popularly called Grasshoppers, and often confounded with Locusts. In this I observed for the first time the probable position of the organ of hearing in Insects, in a similar position to that of Macrourous Crustacea. This species is a close representative of the Great Green Grasshopper of Europe, and has not been figured before.

The last plate, 110, gives detailed illustrations of our common Yellow-winged Locust as a type of the great group of Locusts, often confounded with Grasshoppers, but the characteristic structural differences of these two groups are shown in contrast by the figures on this and the preceding plate.

The succeeding Decades will illustrate as many different genera as possible, and will deal first usually with species of some special interest, and of which good figures do not exist or are not easily accessible.

Frederick McCoy.

30th July, 1885.

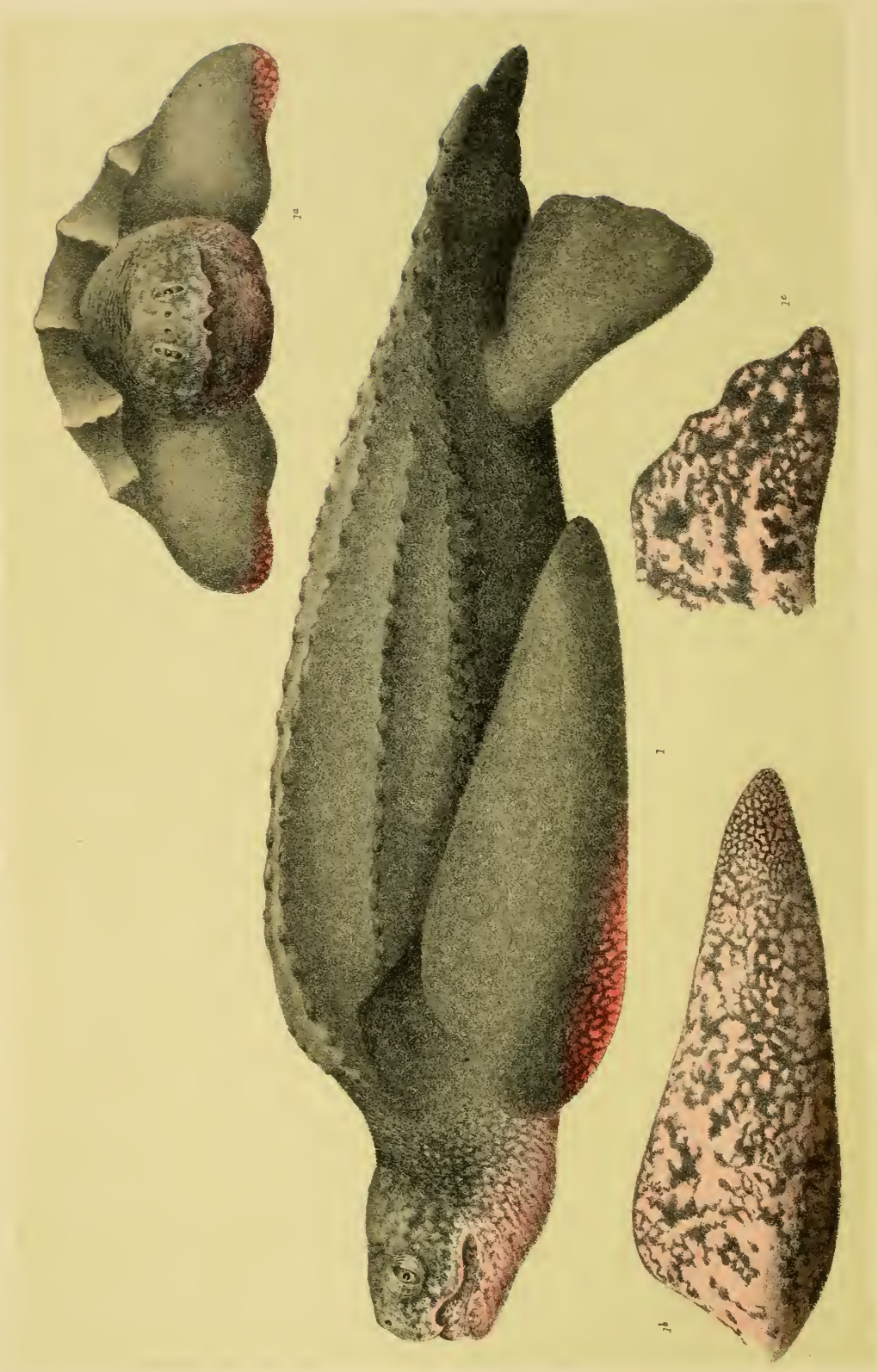
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PLATE 101.

SPHARGIS CORIACEA (LINN. SP.).

THE LUTH, OR LEATHERY TURTLE.

[Genus SPHARGIS (MERREM) = DERMATOCHELYS (BLAIN.) = CORIUDO (FLEM.). (Sub-kingd. Vertebrata. Class Reptilia. Order Chelonia. Sub-order Oiacopodes. Fam. Sphargidæ.)

Gen. Char.—Body covered with a thick, coriaceous skin, concealing the bones of the carapace and sternum; seven longitudinal ridges on the back, tubercular in young, smooth in old individuals. Paddles large; without nails or claws; head with very strong jaws, the upper with three large, triangular notches in front. Orbits very large; eyelids opening vertically, one in front, and one behind; nostrils very small, approximate, on upper surface of nose. Cosmopolitan.]

DESCRIPTION.—*Form:* Carapace sub-cordiform, acutely pointed behind, broad, and with three inflected edges in front, concavely arched backwards, one over the neck, and one over each fore paddle; greatest width over hind base of paddles two-thirds of the length; longitudinal profile slightly arched, most abruptly near the front; transverse curvature nearly semicircular; longitudinal ridges angular, prominent, with about 28 compressed tubercles, the space between the ridges deeply concave; surface smooth; keels nearly equidistant, one along midline of back, the outermost along lateral edges of carapace. Sternum flat, truncated in front, obtuse-angled behind, without projections on surface. Head nearly as wide behind as long, slightly convex above, moderately compressed and rounded in front; smooth, without scales or plates, when adult; jaws very strong, upper one with three deep, triangular notches defining two acutely angular, sharp lobes in front; lower jaw with an upturned, angular point in front, fitting the median notch between the two lobes of upper jaw. Anterior paddles very long, narrow, falcate; posterior paddles short, broad, the two hinder fingers separately movable. Tail slightly compressed, the point reaching a little beyond the end of carapace; whole skin smooth, except on back of neck, which is tubercular from intersecting wrinkles. *Color:* Purplish-black above, sternum and lower sides of paddles, and sides of neck and cheeks marbled with pinkish-white, and reddish-white on front edge of anterior paddles. *Measurements:* Length of carapace, 4 feet 5 inches; greatest width, 3 feet 2 inches; depth, 1 foot; length of head, 8 inches; width, $7\frac{1}{2}$ inches; depth, $6\frac{1}{2}$ inches; diameter of orbit, 2 inches; from anterior edge of orbit to nostril, 2 inches; length of neck, 6 inches; length of anterior paddle, 2 feet 3 inches; greatest width, 9 inches; length of posterior paddle, 1 foot 1 inch; width, 8 inches; length of sternum, 3 feet 2 inches; width, 2 feet 4 inches; tail, 4 inches.

REFERENCE.— = *Testudo coriacea* (Linn.) Syst. Nat. 1, p. 350 = *S. mercurii* (Rondel.) Pisc. Mar. p. 450 = *T. Lyra*, Donnd. Zool. Beiträge, v. 3, p. 2 = *Sphargis mercurialis* (Merrem) Amphib. p. 19 = *S. tuberculata* (Gravenhorst) = *Dermatochelys porcata* (Wagl.) Syst. Amphib. p. 133, t. 1, figs. 1–25 = *Dermochelys Atlantica* (Leseur).

The *Sphargis* differs from the other marine Chelonians, the *Chelonæ*, in the body not being covered with hard plates, but with a very thick skin, smooth when adult, but covered with tubercular

scales when very young, some flat and polygonal, and some convex and circular. The head and paddles also lose the scales when adult.

Of all living Chelonians the Luth is the largest, some recorded being 9 feet long ; our specimen, from its size and the distinct tuberculation of the dorsal ridges, is only half grown ; but there are no traces of the fine ridges on the sternum said to be found in the very young.

The specimen above described is the only one I have known to have occurred on the shores of the colony. It was captured in 1862 at Portland.

Explanation of Figures.

Plate 101.—Fig. 1, side view of specimen, one-ninth natural size. Fig. 1*a*, front view. Fig. 1*b*, anterior paddle, to show coloring of under-side. Fig. 1*c*, hind paddle, to show coloring of under-side.

Frederick McCoy.

1
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1b
1c
1d
1e

PLATE 102.

TRACHYDOSAURUS RUGOSUS (GRAY).

THE RUGGED STUMP-TAIL, OR SHINGLE-BACK, LIZARD.

[Genus TRACHYDOSAURUS (GRAY). (Sub-kingd. Vertebrata. Class Reptilia. Order Sauria. Sub-order Leptoglossæ. Tribe Geissosaura. Fam. Scincidæ.)

Gen. Char.—Form moderately elongate, thick, fusiform; tail very short, broad, depressed. Head large, trigonal, pointed in front; neck very short, narrow (head shields, ears, palate, tongue, body, and limbs as in *Cyclodus*); teeth blunt, conical; scales of back very large, very thick, bony, with a rugged, ridged surface.]

DESCRIPTION.—*Form:* Short, rounded, moderately depressed, sides rounded; head very thick, trigonal, obtusely pointed in front, widening to ear behind; neck short, moderately constricted; back sloped from midline on each side; tail very short, depressed, slightly rounded above, flat below, little narrower than the body, ending in a small, conical tubercle; anterior and posterior feet nearly equal; toes very short, and only slightly different in length, middle one longest, then 2nd, then 4th (a little shorter than the 1st), then the 5th on anterior foot; three first toes gradually longer, 4th shorter than 3rd, 5th shortest on hind foot. *Scales:* Nasal plates very large, meeting over top of rostral;* inter-nasal hexagonal, very slightly wider than long; two fronto-nasals pentagonal, touching by their inner edges; frontal hexagonal small, slightly longer than wide; five supraoculars; eyelids scaly; a curved row of seven suboculars; two fronto-parietals small, hexagonal, joining by inner edges; inter-parietal hexagonal or heptagonal, little larger than frontal;† two parietals heptagonal, little larger than inter-parietal; behind parietals and occiput are four rows of thick, rugged scales like those of neck; two fronto-orbital plates on each side and two frœnals; ear moderately open, with simple margins; scales of back very large, thick, sub-rhomboidal, with numerous, coarse, irregular ridges converging towards middle of posterior edge, those of middle of back largest, having two rows, those of sides forming oblique bands, those of tail with one median large keel ending in a point at the posterior edge; all the lower surface of chest, abdomen, and tail covered with thin, smooth, wide, hexagonal plates. *Color:* Upper surface dark rich Vandyke-brown, with transverse, irregular, paler yellowish-brown bands, forming usually eight or nine transverse, irregular chevrons from neck to tip of tail, one to two scales wide, above irregularly spotted at tip of scales with rich blackish-brown; the intervening, dark spaces two or three scales wide; on under-side the color is yellowish-white, irregularly blotched and mottled with dark brown. The coloring varies considerably; one specimen in the collection being entirely dark brown above, with only one light transverse band, five scales wide, behind the shoulder, and nearly uniform brown below; another is transversely banded on belly and under-side of tail, much as on the back; while in another the dark marks below are chiefly longitudinal blotches. Tongue flat, wide, notched at the tip, blackish-purple; inside of mouth pinkish-white.

* In some specimens the nasals do not touch, but the rostral and inter-nasal touch.
† In some specimens smaller, and the length and width equal.

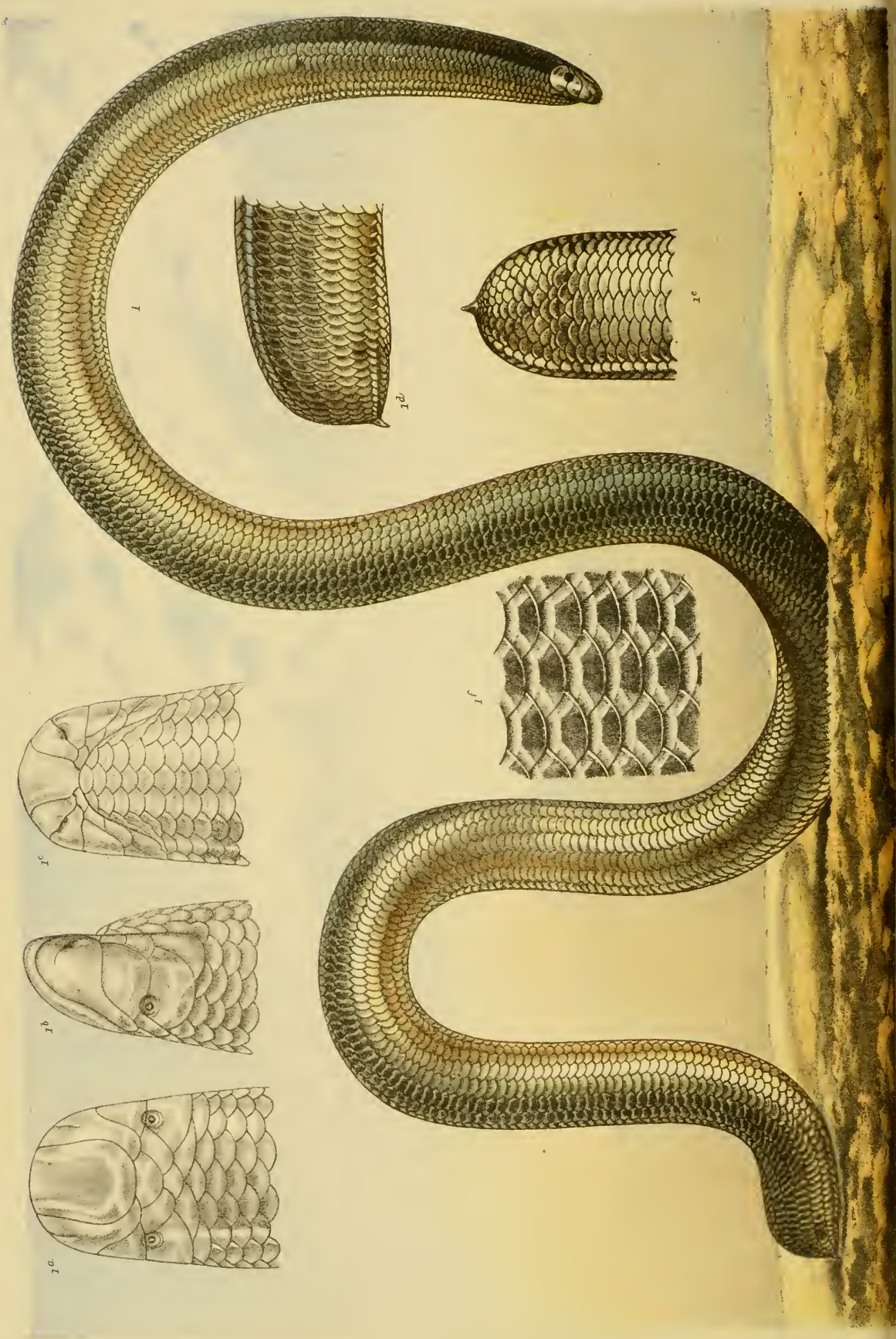
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PLATE 103.

TYPHLOPS NIGRESCENS (GRAY sp.).

THE BLACKISH AUSTRALIAN WORM-SNAKE.

[Genus TYPHLOPS (SCHNEIDER). (Sub-kingd. Vertebrata. Class Reptilia. Order Ophidia. Tribe Scolecophidia. Fam. Typhlopsidæ.)

Gen. Char.—Cylindrical, glossy; head not constricted from body; front margin obtusely rounded from above downwards; rostral plate very large, extending over top of head; nasal plates extending vertically from labials to above eye, divided by a sulcus extending from nostril; preocular plate usually present, oculars larger than preocular, with the eye seen through them when it exists; upper labials usually 4; scales hexagonal, imbricated, alike on back, sides, and abdomen; preanal scales numerous, and like the ventrals. Teeth simple, 3 or 4 in upper jaw only. Tongue long, flat, forked at tip. Mouth small, lunate, inferior.]

DESCRIPTION.—Body smooth, glossy, cylindrical, of nearly equal diameter throughout, and covered with 22 rows of hexagonal scales, the posterior edge of each nearly semicircular and much imbricated. Tail very short, of the 12 last scales, obtusely rounded and bent downwards at the end, so that the terminal thorn arises nearly on a level with the ventral surface and inclines downwards. Head narrower than the body, depressed, obtusely rounded in front both vertically and transversely; rostral plate large, margin broadly rounded on top of head behind, slightly concave towards front, and narrowed to edge of lip below; nasal plate rising from 1st labial, widening to edge of snout, and narrowing upwards to inter-nasal plate behind rostral; nostril below lateral margin, with a sulcus dividing the plate into two below, where it touches the middle of the 1st labial; the nasal sulcus extends vertically upwards beyond the nostril rather further than below; 2nd labial a little larger than first, touching nasal and preocular plate; 3rd labial larger, and extending up between bases of preocular and ocular plates; 4th labial largest, rounded, and with a small notch on lower hind margin. The three anterior, median, vertex plates, taken together, about two-thirds the length of the dorsal part of rostral plate; the 1st, or inter-nasal plate, largest, sub-hexagonal, the posterior margin nearly semicircular; 2nd, or frontal, smallest, hexagonal; 3rd, or occipital, in size and shape nearly like the 1st; they and the labial ones are larger, but nearly like the scales of the body. Preocular narrower than the ocular, the eye distinctly seen through the upper part of their junction, below the re-entering angle for the fronto-nasal plate. *Color:* Twelve rows of scales on back and sides, each greyish-brown on posterior two-thirds, whitish on anterior third, generally paler and browner towards the head; lateral portions of anterior head shields and all the scales of lower side of body yellowish in some specimens, greyish-white in others; the coloring of the scales of back is seen through the transparent overlapping ones in front. Length of average specimen, 21 inches 6 lines; of tail, 4 lines; diameter at base of tail, $5\frac{1}{2}$ lines, in both directions; diameter in both directions about middle of body, 7 lines; length of head from front edge of snout to hind edge of third median (occipital) plate, $4\frac{1}{2}$ lines; width of head, 4 lines.

REFERENCE.—*Anilios* id. Gray, C. Liz., B.M. p. 135 = *Typhlops* id. Jan. Icon., Gen. des Ophid., p. 13; Liv. 9, t. 1, f. 1; ? = *T. Rüppelli*, Jan. Op. Cit., t. 1, f. 2.

The "Slow-Worms" or "Blind-Worms" of English writers, and their numerous allies in various foreign countries, are very difficult to classify, from their having several characters of Lizards combined

with most of those of Snakes. The absence of external limbs, although striking the popular eye, is not a distinctive character, for in some undoubted Lizards these are wanting.

The "Worm-Snakes," as the curious group of Reptiles called *Scolecophidiæ* by Dumeril and Bibron may be termed, are so singularly like the "Slow-Worms" or "Blind-Worms" of English writers in size, shape, general appearance, and habits, that it is not easy for the popular observer to discriminate them. The absence of limbs is a character of Snakes common to both ; but the true "Slow-Worms" have the two halves of the lower jaw united by bony union at the chin, as in the Lizards, and also agree with them in having movable eyelids, and more or less distinct external drum to the ear, as well as some rudiments under the skin of the limbs. The present Worm-Snakes, on the other hand, have the halves of the lower jaw free and separable in front, as in the *Ophidiæ*, or Snakes, and, like them, also, are destitute of eyelids and external ear-drums, so that the balance of the structural evidence would go to classify the Worm-Snakes with the Snakes, and the Slow-Worms with the Lizards. Nevertheless, Dr. Gray, as well as Fitzinger and Schlegel, class the creatures I propose to call "Worm-Snakes" with the Lizards or Sauria, as well as the "Slow-Worms," or *Anguis*, and other allied small snake-like *Lacertilia*, and at one time Dr. Gray proposed to form an Order *Saurophidia*, to include *Typhlops*, *Anguis*, and a number of other snake-shaped reptiles which are now, however, by general consent, kept in different orders.

The "Worm-Snakes," by their small size, cylindrical body—scarcely tapering at the very short tail, both ends being much alike—glossy smooth surface, and habit of burrowing in the loose soil, differ from all other Serpents and Snakes, and sufficiently resemble Earth-Worms, to excuse the use of a popular name, recalling the similar ones of Blind-Worm and Slow-Worm applied to the species of *Anguis*, although they are neither blind nor slow. The muzzle is broader, in proportion to the back of the head, than in ordinary Snakes, and the bones of the anterior part of the head and face are solidly joined together, so that the mouth is incapable of the dilatation of Snakes in general, although, like them, and

unlike Lizards, the halves of the lower jaw are not joined together in front, and the mouth, by its inferior position, like that of a Shark, below and behind the tip of the snout, differs equally from Lizards and Snakes. The small number of teeth, and their being either in the upper or under jaw, but not in both, is a special peculiarity of the group of Worm-Snakes. Another peculiarity of this group is the fact of the eyes being covered by one or two large plates of the side of the head, and through the translucent substance of these plates the eyes underneath may be dimly seen when they exist. Some seem to be blind, as, indeed, their subterranean habits and finding the Earth-Worms and larvæ of insects for food, in the dark earth, without the sense of sight, might lead one to expect.

By a sort of practical joke, not uncommon in nature, the posterior, or tail end, in this species is made to look almost exactly like a head, by a pair of round black spots, so nearly of the size, shape, and color of the real eyes of the other end, and so similarly placed over the ends of the transverse, lunate, mouth-like slit on the ventral surface of that end, as to be readily taken for the eyes by an unpractised observer, taking away even the crucial test by which the boys in Leech's caricature terminated their dispute as to which was the head of the Skye terrier, by one at last "seeing the eyes" at the most unlikely end. The presence of these two eye-like posterior spots is almost the only character set down by Prof. Jan as distinguishing his *T. Rüppelli* from Gray's *T. nigrescens;* but as the only specimens in which I could not see these spots had the skin so opaque, from being near the time of casting it (when the real eyes are also obscured), I have no doubt of both belonging to one species, as Prof. Peters has already suggested in the Monatsbericht der Königl. Preuss. Akad. der Wissenschaften zu Berlin, for June 1865, p. 262. There is, too, a singularly deceptive appearance produced by the transparent scales of the back, showing the semicircular dark margin, not only on the exposed, posterior edge of each, but continued visibly through the transparent, adjacent, overlapping scales, so that the apparent scales marked by the coloring do not coincide with the real scales marked by the free edges, as seen with a lens and as represented in our figure (1*f*).

Although Dr. Gray was the first to describe this species (under

the generic name *Anilios*), there can be no doubt that he is unaccountably in error in stating that there are no upper labial shields in the family *Typhlopsidæ*, as the four are clearly present in all our specimens, as described by Prof. Jan.

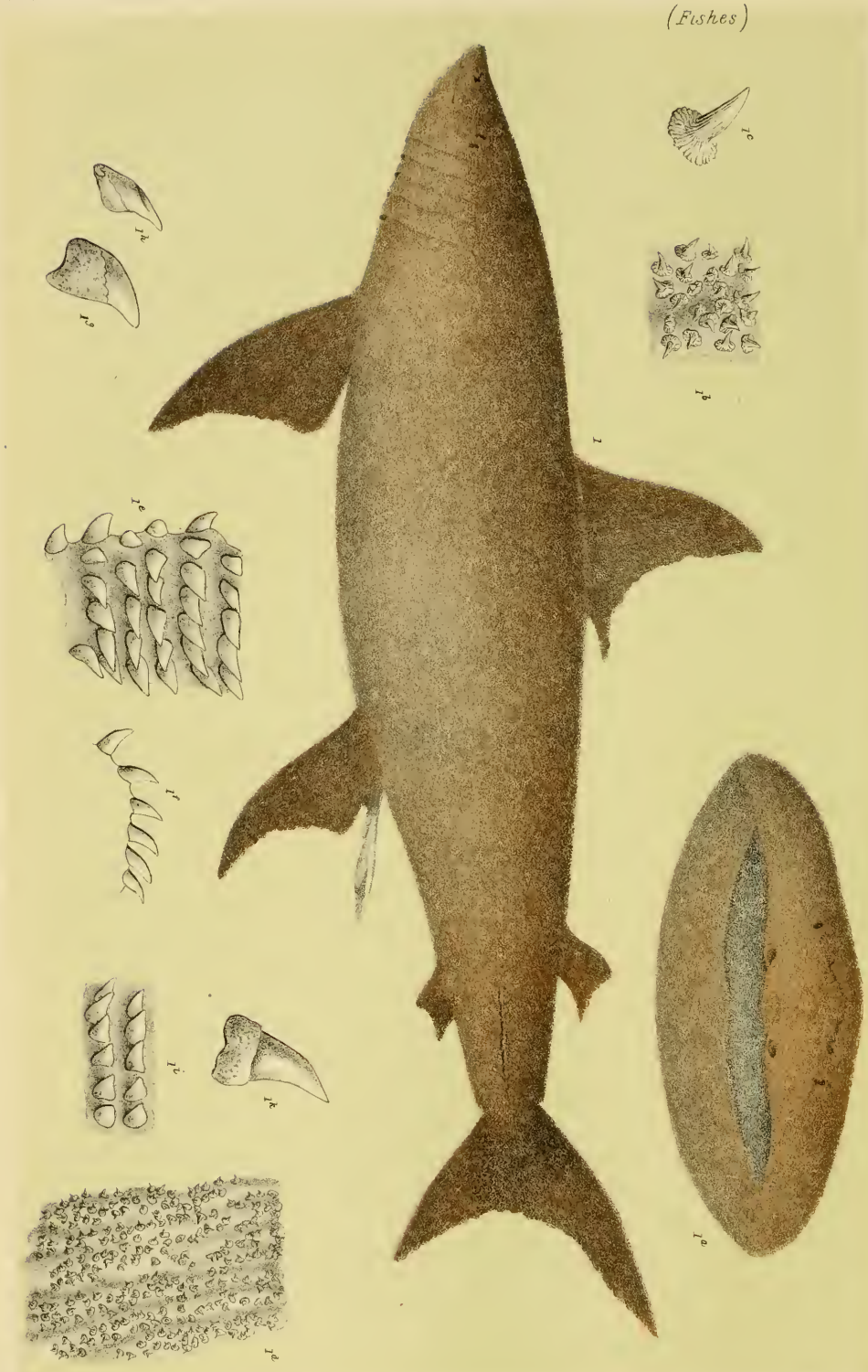
The "Blackish Worm-Snake" is not uncommon in the northern warmer parts of the colony in localities having a loose, friable, or sandy soil, in which it burrows to a considerable depth with extraordinary ease and quickness. The specimen figured is from Murchison, presented by Mr. H. J. E. Brisbane; but two still larger ones sent to me alive by Mr. J. P. Watt, from Taripta, I have kept alive for some time in large glass jars half filled with sandy soil at bottom, into which, when brought to the surface, they burrow so rapidly that the whole body is out of sight in an instant —the head being first raised, then arched and forced down with such strength that the glossy smooth body is quickly buried to the greatest depth. These specimens were dug out of an ant-hill in which they dwelt in the midst of the abundant insect food suited to them. It is almost impossible to hold them, they struggle with such strength, and are so smooth and slippery. The tongue is very long, narrow, flat, largely forked at the end, and of a dull red color, being darted out frequently to a length of an inch or so, as in ordinary Snakes. These Worm-Snakes are perfectly harmless, although, like the Slow-Worms and their allies in other countries, they are popularly supposed to be very poisonous. They do not attempt to bite when handled; and as the mouth is so very small and incapable of dilatation, and the few very small teeth are solid, and there are no poison glands, there could be no harm to man if they did.

It has not been figured of the colors of life before.

Explanation of Figures.

Plate 103.—Fig. 1, large specimen, natural size, partly embedded in sand at middle, and showing the position assumed by the anterior end and head when about to plunge into the sand to bury itself. Fig. 1*a*, upper view of head, three times the natural size, to show form of cephalic plates, with relative sizes of rostral, inter-nasal, frontal, and occipital plates in midline, and the extension of the nasal sulcus on the nasal plates, also showing the covering over of the eye by the preocular and ocular plates, and slightly by the outer angle of the fronto-nasal plate. Fig. 1*b*, side view of head, magnified three diameters, showing upper labial, nasal, preocular, and ocular plates, and eye and nostril and nasal slit in due relation. Fig. 1*c*, under view of head, showing narrowed end of rostral plate touching the mouth, and the relation of the labial plates to the others. Fig. 1*d*, side view of tail, twice natural size, showing posterior thorn and eye-like spot. Fig. 1*e*, ditto, from under-side, to show anal plates. Fig. 1*f*, scales of back, four times the natural size, to show markings of color through the overlapping scales.

Frederick McCoy.



A. Bartholomew del. et lith.

Prof. McCoy direx.

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PLATE 104.

CETORHINUS MAXIMUS (LINN. SP.).

THE BASKING SHARK.

[Genus CETORHINUS (BLAINV.) = SELACHE (GOT.). (Sub-kingd. Vertebrata. Class Pisces. Order Placoida. Sub-order Selachoidea. Fam. Lamniadæ.)

Gen. Char.—Snout short, narrow, blunt; spiracles small, above angle of mouth. Gill-slits five, very large, nearly meeting under throat. Teeth very numerous, very small, conical, moderately arched backwards, without denticulation or lateral cusps; scales of slender, erect, slightly curved points, rough to the touch in all directions. First dorsal opposite space between pectoral and anal, without spine; second dorsal small, slightly in advance of the equally small anal; caudal lunate, with pit at base above and below; tail keeled on sides. No nictitating eye-lid.]

DESCRIPTION.—Fusiform, head very small, abruptly narrowed to a short snout with a slightly concave profile rising from a little behind the eye; several mucous pores at the sides; eyes near tip of snout; nostrils near edge of upper lip; spiracles small, above and a little behind the angle of the jaw. Gill-slits enormously large, reaching from high above middle of sides to nearly meeting under throat. Teeth very small, simple, conical, slightly arched backwards, six rows of about 120 on each side of lower jaw, and five rows of about 109 in each side of upper jaw; those of under jaw a little wider than the upper ones. First dorsal large, over the space between the pectoral and ventral fins, upper angle approaching a right angle, hinder angle narrow, prolonged, pointed; 2nd dorsal small, upper angle obtusely rounded, hind angle acutely prolonged; anal fin resembling the 2nd dorsal, nearly under, and slightly behind it; pectorals broad, pointed, a little behind the last gill-opening; ventrals moderate; claspers of male small; caudal fin with a deep, transverse pit at base above and below, lunate, upper lobe larger than lower; a strong keel on each side from middle of base of tail to a little behind base of anal fin. Skin covered with very numerous, irregular, flexuous, rounded wrinkles, their own diameter apart, and about 10 in one inch, nearly vertical on most of the body, but longitudinal on head, and obliquely transverse on bands between gill-openings, closely set with nearly erect, slender, conical, slightly-curved thorns, about four in 1 line (or eleven in $\frac{1}{4}$ inch), about $\frac{1}{5}$ line long, and rendering the surface rough to the touch in all directions, but least so towards the tail, in which direction they chiefly incline; the individual wrinkles are not more than 1 or 2 inches long. *Color:* Nearly uniform blackish-brown or tar-color, lighter below; iris brown.

MEASUREMENTS.	Feet.	inches.
Length from tip of snout to tip of upper lobe of tail ...	30	6
„ „ „ origin of first dorsal	9	8
„ across from one angle of mouth to the other ...	2	9
„ of upper jaw	2	2
„ of lower jaw	1	11
Nostrils on edge of upper lip, distance apart	1	0
Girth at middle of body	20	0
Length from tip of snout to anterior edge of orbit	0	9½
„ „ „ „ „ of pectoral fin ...	6	0
„ of anterior edge of pectoral	5	9

Measurements—*continued.*	Feet.	inches.
Width of pectoral	2	3
Length from anterior base of pectoral to anterior base of ventral	9	3
„ of anterior edge of ventral	4	9
„ of terminal edge of ventral	3	0
„ of base of ventral	1	8
„ of claspers of male	3	9
„ from posterior edge of base of ventral to anterior edge of anal	4	8
„ of anterior edge of anal	0	9
„ of terminal edge of anal	1	2
„ of posterior edge of anal	0	7
Diameter of orbit	0	3
Distance of eyes apart	1	3
Length from posterior edge of orbit to spiracle	1	6
„ „ angle of mouth to spiracle	1	2
Depth of snout at vertical of eye, upper jaw	0	9
„ „ „ „ lower jaw	0	8
Length from tip of lower jaw to anterior edge of pectoral ...	5	6
„ of longitudinal space occupied by the five gill-slits ...	2	0
„ of anterior edge of first dorsal	5	0
„ of hinder edge of first dorsal	1	5
„ of top edge of first dorsal	5	0
„ of base of first dorsal	3	4
„ from posterior edge of base of first dorsal to anterior edge of second dorsal	7	3
„ of anterior edge of second dorsal	1	4
„ of upper edge of second dorsal	1	5
„ of posterior edge of second dorsal	1	3
„ of base of second dorsal	1	0
„ from posterior edge of second dorsal to tip of upper lobe of caudal	9	6
„ from tip to tip of caudal fin	7	0
„ from tip of upper caudal lobe to pit at base ...	5	7
„ from tip of lower caudal lobe to pit at base ...	4	0
„ from middle of caudal fin to posterior end of keel ...	2	3
„ of teeth towards middle of mouth, where largest ...	0	$0\frac{1}{4}$
Number of teeth in a space of one inch, about five.		

Reference.— = *Squalus maximus*, Gunner, Beschreibung des Brugden in Schriften der Drontheimschen Gesellsch. Theil. 3, p. 28 (1765) = Id. Linn. Syst. Nat., ed. 12, vol. I., p. 400 (1798) = *Cetorhinus Gunneri*, + *C. Homianus*, + *C. Shavianus*, Blainville, Bull. Soc. Phil., 121 (1816) = *Selache maxima*, Goyean, Hamburg Magazin, vol. 24, p. 531, Cuv. Reg. An., vol. 2, p. 391 (1829).

As De Blainville's generic name, *Cetorhinus*, has a clear priority over Goyeau and Cuvier's *Selache*, and as the approximation to the characters of Whales is curiously greater in this than in any other fish, I have followed Dr. Gray in adopting it for the present Shark. The extraordinary circumstance of the individual I have here figured and described having come so far south gives special interest to this specimen, which was caught in November, 1883, at Portland, on the western coast of Victoria. It, as often happens in the northern hemisphere, to which, until this occurrence, it was

supposed to be confined, was found entangled in the nets of the fishermen, and having wrapped the nets round itself by rolling and struggling, it became exhausted and was killed. In other countries where fishermen have recorded their meetings with this monster, the accounts agree in showing it to be a quiet, sluggish creature, quite destitute of the ferocity of other Sharks, swimming along, showing its back and dorsal fin above water, and with its mouth open to catch its small, floating food, like a Whale, and when basking quietly on the surface being so indifferent to the approach of a boat that the man may feel it without any alarm or movement of anger on the part of the Shark, unless harpooned, when it darts to the bottom with great force and velocity, and unlike a Whale, which must come up to breathe, it stays below, making it a dangerous captive for any ordinary fishing vessel.

The excessively small size of the teeth, far smaller in proportion than in any other Shark, and the very small size of the gullet, shows a curious approach to the Whales, and departure from the usual structure of Sharks. And I find another extremely curious and interesting point, not before noticed, viz., that its food, as with many Whales, is often composed of myriads of the minute, floating, oceanic Pteropodous Mollusca. Of the scores of Basking Sharks that have been opened in the Northern Hemisphere not one contained any remains of fishes or large objects, and the food was, until now, unknown. Linnæus mentions Medusæ, Pennant suggests sea-weeds, and Mr Low says he found a pulpy red mass, which he likened to bruised crabs, or the roe of Echini. Neither crabs nor Echini could be obtained by a creature like this, too large to approach the shallow shores, and in all probability what Mr. Low saw was what I have here noted, the red pulpy mass filling the intestines of our example being altogether composed of body and shells of a species of the genus *Cuvieria* or *Triptera*, rather less than a line long, fusiform, pointed, and slightly arched at posterior end, mouth contracted, oblique (which might be named *Cuvieria minor*), the mass being tinted of a "boiled-shrimp" red from the remains of the soft parts, colored like the much larger *Triptera rosea* of Quoy and Gaimard. I owe the knowledge of this food to my vigilant friend,

Mr. M. Dusting, of Portland, who sent me a sample he had taken from the intestines when giving me notice of the capture of this Shark, the species of which he correctly recognised.

The tongue is very small, with little movable part, the greater portion of the mouth being occupied by the gill-openings.

This is the largest species of the whole class of Fishes (one noted by Yarrell, at Brighton, being 36 feet long), and as, like many Whales, and unlike other Sharks, it migrates in shoals of one to two hundred individuals, each of which is worth from £30 to £50, it is of great value where any peculiarity in the ocean (as at the "Sunfish Bank," one hundred miles west of Clew Bay, on the west coast of Ireland) induces it to come regularly within reach of the fishermen. The liver only is taken, the rest of the body being left at about a day's sail out of sight of land where they are found. The liver weighs about two tons, and yields 10 or 12 barrels (eight to the ton) of the finest oil, like spermaceti. The specimen figured, after its liver was taken out, was brought by railway to Melbourne, and attracted crowds in the streets as it came up Swanston-street on two of the largest lorries fastened together, drawn by a long train of horses to a stable-yard, where it was exhibited during the race week; the hot weather rendering it useless as a specimen for the Museum afterwards. The teeth and portion of skin were preserved, and all the measurements and the drawings completed before it defied approach.

This is the first good figure of this famous Shark which has been published. The figures of Yarrell and Couch represent the anal fin as too small and much too far back; Home's figure of a male, exactly the same size as ours, in the Philosophical Transactions for 1809,* omits the anal fin altogether, but is otherwise the best of those hitherto published; the skin seems too smooth, the lower jaw too long, and the concavity of the profile is not represented. The concavity of the profile (as well as the size of the mucous pores

* "An anatomical account of the *Squalus maximus* (of Linnæus), which, in the structure of its stomach, forms an interesting link in the gradations of animals between the Whale Tribe and cartilaginous Fishes," by Everard Home, Esq., F.R.S., read May, 1809.

on the snout) is exaggerated in Couch's figure. De Kay's figure and one of Shaw's ridiculously exaggerate the wrinkling of the skin, and all show one or another variation of badness, mutually correcting each other, but rendering the figure here given very desirable.

Explanation of Figures.

Plate 104.—Fig. 1, side view of male, one forty-second part of the natural size (an apparent doubling of the spiracle is an accident in the lithography). Fig. 1*a*, front view of mouth open, to show the rows of very small teeth, and front view of head, to show the position of nostrils on edge of upper lip. Fig. 1*b*, portion of skin, magnified two diameters. Fig. 1*c*, one of the thorns, magnified nine diameters. Fig. 1*d*, portion of skin, natural size, to show the wrinkles or ridges and the thorny spines inclined in every direction. Fig. 1*e*, six rows of teeth from front portion of left side of lower jaw, natural size. Fig. 1*f*, same, viewed in profile, to show curvature of surface to which the teeth are attached. Figs. 1*g* and 1*h*, two of same teeth, magnified two diameters. Fig. 1*i*, two of the rows of teeth from portion of upper jaw, natural size. Fig. 1*k*, one of same, magnified two diameters.

Frederick McCoy.

Ulvaria
Tubicellaria
Urceolifera

Dr Mac Gillivray del.
J. Bracegirdle lith.
Prof. McCoy direxit.
Steam Litho Govt. Printing Office

Plate 105, Fig. 1.

CELLARIA RIGIDA (McG.).

[Genus CELLARIA (Lamx.) = SALICORNARIA (Cuvier). (Sub-kingd. Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Fam. Salicornariidæ.)
Gen. Char.—Zoarium simple or branched, cylindrical, with the zoœcia arranged around an imaginary axis.]

Description.—Polyzoary regularly dichotomously branched; branches cylindrical, slightly arcuate, usually enlarging upwards; zoœcia mostly rhomboidal, pointed above and below; mouth in the upper half, lofty, slightly contracted towards the straight lower lip; operculum with, on each side, a cervicorn mark, and posteriorly a projecting, somewhat wedge-shaped process for the attachment of the occlusor muscles. Avicularium very large, replacing a cell; mandible of great size, nearly semicircular. Ovarian cells rounded above, narrowed below; the pore semilunar at the extreme upper end of the cell, with the lower edge usually projecting and smooth or obscurely crenulate.

References.—P. H. MacGillivray, Trans. Roy. Soc. Vict. 1884; *Salicornaria simplex*, Busk, Challenger Polyzoa, p. 88, pl. xxxiii., f. 8.

Port Phillip Heads, usually on Dictyopora.

This fine species forms tufts 1 to 3 inches high. The articulations are frequently rigid from calcification. The internodes are thick and usually slightly curved. The zoœcia are nearly regularly rhomboidal; the ovarian ones broad and rounded above and narrowed below. The mouth is situated in the upper half, the lower lip corresponding to about the middle of the zoœcium; deep in the interior are two sharp, stout, calcareous denticles from each of the upper and lower margins, directed vertically upwards and downwards. The operculum is very peculiar; it has a large cervicorn mark on each side, and the occlusor muscles are attached to projecting, wedge-shaped processes. The avicularium is of great size, replacing a cell; the upper margin projects much forwards, and the mandible is very large, nearly semicircular, and directed upwards. The ovarian pores are mostly semilunar, situated close to the upper margin of the zoœcium, and about the same width as the mouth; the lower edge projects upwards as a sort of lip, which is either smooth or very faintly crenulate.

In Decade V., pl. 49, I described a form of Cellaria as *C. fistulosa*, var. *australis*. Having subsequently, through the

kindness of Mr. Hincks and Mr. Waters, received European specimens of *C. fistulosa*, I was satisfied that they ought to rank as distinct species, and therefore proposed (Trans. Roy. Soc. Vict. 1884) to name it *C. australis*. In the Challenger Polyzoa Mr. Busk has described the same species as *Salicornaria clavata*, probably not having noticed that I had already changed the varietal into a specific name.

Explanation of Figures.

Plate 105.—Fig. 1, specimen, natural size. Fig. 1*a*, portion of same, magnified, showing outline of zoœcia and an avicularium. Fig. 1*b*, group of zoœcia and an avicularium. Fig. 1*c*, single zoœcium, showing the intra-oral denticles. Fig. 1*d*, three zoœcia, two showing the ovarian pores.

Plate 105, Fig. 2.

TUBUCELLARIA CEREOIDES (Ellis and Solander).

[Genus TUBUCELLARIA (D'Orbigny). (Sub-king. Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Fam. Tubucellariidæ.)

Gen. Char.—Zoarium consisting of cylindrical internodes connected by corneous tubes; branches arising dichotomously or irregularly from the sides of the segment to which they are attached. Zoœcia prominent above, narrowed below, when young distinct, but when older indistinct; peristome produced into a short tube; frequently a small, circular, median pore in front; surface punctate.]

Description.—Zoarium consisting of cylindrical branches, each branch articulated by a corneous tube to the side of that from which it springs. Zoœcia indistinct; mouth circular; whole surface punctate.

Reference.—P. H. MacGillivray, Trans. Roy. Soc. Vict. 1884.

Port Phillip Heads, Mr. J. Bracebridge Wilson.

Of this I have only seen two specimens, sent to me by Mr. J. B. Wilson; one three-quarters of an inch in length, the other smaller. The zoarium consists of cylinders branched exactly as in *Cellaria australis*, the branches arising from the sides of those from which they spring by flexible corneous tubes. The zoœcia are, on the surface, quite confluent, and mostly only distinguishable by their mouths. The whole surface is beautifully punctate, the punctations being caused by the reticulation of chains of small depressions or pores. There is usually a minute circular opening about the middle of each zoœcium.

Explanation of Figures.

Plate 105.—Fig. 2, specimen, natural size. Fig. 2*a*, portion of same, magnified.

Plate 105, Figs. 3 and 4.

URCEOLIPORA DENTATA (McG.).

[Genus URCEOLIPORA (McG.). (Sub-king. Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Fam. Bifaxariidæ.)

Gen. Char.—Zoarium continuous, irregularly branched. Zoœcia alternate, in two series, facing opposite ways, and each springing from the upper and posterior part of that immediately preceding; oral opening facing directly or obliquely upwards, entirely occupied by the operculum; a slight ridge on each side of the zoœcium, probably indicating a shallow anterior compartment.]

Description.—Zoœcia arranged in a double series facing opposite ways, alternate, elongated, sub-cylindrical, but narrowed below and projecting in front; mouth terminal, oblique, lower margin straight, upper semicircular, with usually five short, stiff spines. Oœcia large, smooth, imbedded in the front of the zoœcium above.

Reference.—P. H. MacGillivray, Trans. Roy. Soc. Vict., Nov. 1884.

Port Phillip Heads, dredged by Mr. Wilson and myself.

Forms small tufts about an inch high. The zoœcia bear a marked resemblance to those of *Calwellia bicornis*, although there is not the same peculiar mode of connection. On the lower lip there is on each side a minute mark or pit, and immediately below a small median pore.

Explanation of Figures.

Plate 105.—Fig. 3, specimen, natural size. Fig. 3*a*, portion of the same, magnified. Fig. 3*b*, two zoœcia, more highly magnified. Fig. 4, small portion of another specimen, mounted in balsam by Mr. Wilson, seen by transmitted light, showing two oœcia.

Plate 105, Figs. 5–7.

URCEOLIPORA NANA (McG.).

Description.—Zoœcia elongated, urceolate, mouth terminal, opening nearly vertically upwards, lower lip hollowed, with a projecting, sub-triangular process on each side, sometimes bearing a small avicularium. Oœcia with the surface minutely cribriform or marked with radiating beaded lines.

References.—P. H. MacGillivray, Trans. Roy. Soc. Vict. 1880; ? *Callymmophora lucida*, Busk, Challenger Polyzoa, p. 84, pl. xxxii., fig. 8.

Port Phillip Heads.

This species forms small, dichotomously branched, rigid tufts, about half an inch high, growing on Retepora and other Polyzoa.

It differs from the last in its stouter habit, the mouth opening more directly upwards, the single sub-triangular process on each side, and the radiately marked or cribriform oœcia.

EXPLANATION OF FIGURES.

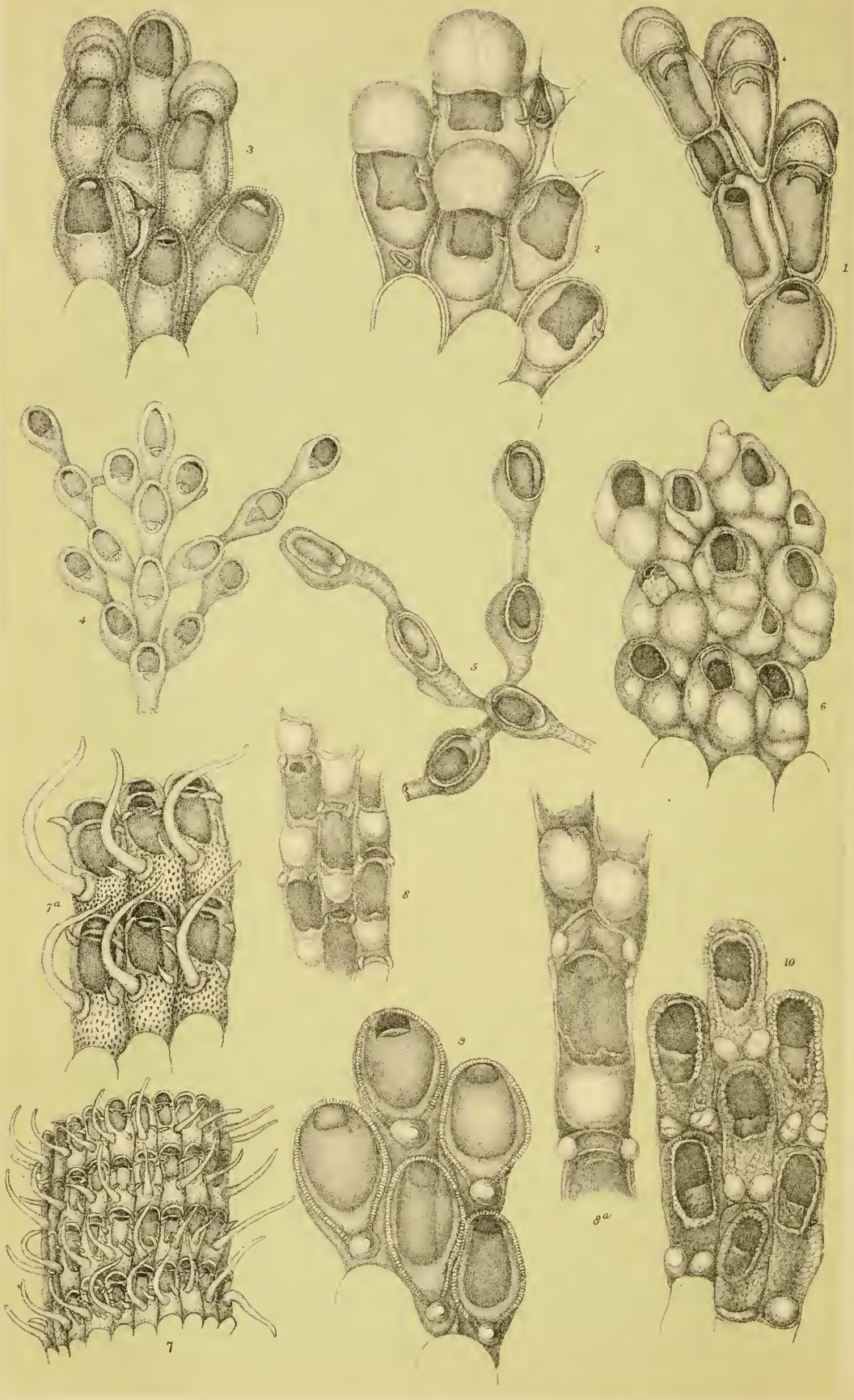
PLATE 105.—Fig. 5, specimen, natural size. Fig. 5*a*, portion of same, magnified. Fig. 5*b*, another portion, more highly magnified. Fig. 6, two cells and radiately marked oœcium (from dried specimen), viewed in front. Fig. 7, portion of a specimen mounted in balsam, showing cribriform oœcia and portions of loose epitheca.

These two species form a well-marked genus, for the second of which I proposed in 1880 the name *Urceolipora*. Mr. Busk, in the Challenger Polyzoa, having no doubt overlooked my previous description and figure, describes a form which is probably identical with *U. nana* as *Callymmophora lucida*, taking the name from the loose veil-like disposition of the epitheca. I have not had an opportunity of examining living or spirit-preserved specimens, but I believe that this will probably be found a characteristic feature. It is shown partly in figures 4 and 7, as well as in my original figure, which are taken from specimens beautifully mounted in balsam by Mr. J. B. Wilson ; and shreds of the membrane can also be detected in some of my dried specimens.

I am indebted to Mr. MacGillivray for the descriptions and specimens of the Polyzoa on this plate.

FREDERICK MCCOY.

Lagenobelestrum
Pyrapora
Electra
Bathypora
Biflustra


3
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7a
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8a
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10
7

PLATE 106, FIG. 1.

AMPHIBLESTRUM PUNCTIGERUM (HINCKS).

[Genus AMPHIBLESTRUM (GRAY). (Sub-king. Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Fam. Membraniporidæ.)

Gen. Char.—Zoarium encrusting. Zoœcia with the aperture occupying the whole front or with part of the zoœcium produced below; aperture partly filled in by an additional membranous or usually calcareous lamina.]

DESCRIPTION.—Zoœcia variously shaped, separated by raised smooth margins; aperture occupying the whole front, except a very narrow space below and at the sides which is filled in by a thin, calcareous, smooth or faintly granular membrane. Oœcia large, faintly granular, with a mitriform or quadrate portion in front separated by a narrow raised line.

REFERENCE.—Hincks, Ann. and Mag. Nat. Hist., July 1881.

Port Phillip Heads, on algæ.

This seems to be a rare species, as I have only seen two or three not very good specimens. The zoœcia are of a large size and very variable in shape. The raised margins are narrow and smooth. There is a very narrow calcareous membrane, sometimes scarcely distinguishable, on the lower part and extending up the sides. The mitriform or quadrate space on the front of the oœcium seems to be caused by a deficiency of the outer layer at this part.

EXPLANATION OF FIGURES.

PLATE 106.—Fig. 1, small portion of a specimen, showing the various shapes of the zoœcia, the irregularity in extent of the calcareous thickening of the membrane, and three oœcia.

I have followed Busk (in the Challenger Polyzoa) in considering those Membraniporæ with the membranous aperture partly filled by a thicker chitinous or calcareous lamina as a distinct genus, and have adopted his name derived from Gray. Gray, however, originally proposed the name for *M. membranacea*, which in my opinion ought to be taken as the type of the true Membraniporæ, the name having been first applied to it by Blainville. Gray, moreover, makes no reference to an additional thickening of the membranous front, which in fact does not exist in *M. membranacea*. Those species previously described in this work as Membraniporæ and which are referable to the present genus are *M. umbonata*, *cervicornis*, and *Rosselii*.

PLATE 106, FIG. 2.

AMPHIBLESTRUM FLEMINGII (BUSK).

DESCRIPTION.—Zoœcia large, variously shaped, surface granular; inner aperture large, obscurely trifoliate; a spine on each side. A sessile avicularium at the base of a zoœcium, with the mandible directed upwards or laterally. Oœcia large, prominent.

REFERENCES.—Busk, Cat. Mar. Pol. Brit. Mus, pt. ii., p. 58, pl. lxxxiv., figs. 3–5; Hincks, Brit. Mar. Polyzoa, p. 162, pl. xxi., figs. 1–3.

Port Phillip Heads, dredged by Mr. J. B. Wilson and myself.

I have only seen two small fragments of this species, but I have no doubt that it is identical with *M. Flemingii*, although differing in size and appearance of the oœcia from those of the only European specimen I have. In the Victorian specimens the zoœcium is generally produced below the margin, and it is in this part that the avicularium is situated. The mandible is usually pointed directly upwards, but it is occasionally transverse to the zoœcium. In the European form there are generally two avicularia at the base of a zoœcium. In my specimens most of the zoœcia are destitute of spines, and when present there is only one on each side. The oœcia are very large, some with a space marked off in front, but most without any differentiation.

EXPLANATION OF FIGURE.

PLATE 106.—Fig. 2, portion of specimen, magnified, showing ovicells and avicularia.

PLATE 106, FIG. 3.

AMPHIBLESTRUM PERMUNITUM (HINCKS).

DESCRIPTION.—Zoarium very calcareous. Zoœcia variously shaped, wider in the middle, separated by raised, crenulated margins; secondary aperture occupying nearly half of the front of the zoœcia, somewhat quadrate, but wider below; front of zoœcium below the secondary aperture porcellanous, finely tubercular and crenulated at the edge. Avicularia on special tracts at the base of smaller zoœcia; mandible falcate, with an expanded base, directed obliquely upwards. Oœcia small, prominent, finely granular, with a crescentic smooth band about the junction of the upper with the middle third.

REFERENCE.—*Membranipora permunita*, Hincks, Ann. and Mag. Nat. Hist., Feb. 1881.

Port Phillip Heads; Portland, Mr. Maplestone.

I had previously (Trans. Roy. Soc. Vict. 1868) described this as *M. falcata*, but as my description was taken from a single imperfect specimen, it was scarcely exact enough. I have therefore adopted the name subsequently given to it by Mr. Hincks, who described it from better specimens. The whole zoarium is very calcareous, the calcareous lamina of the membranous aperture being thick and granular. The avicularia are very peculiar. They are situated on special tracts at the base of small, imperfectly developed zoœcia intercalated among the others. The mandible is falciform, the concave edge thick, the other formed by a thin membrane; it expands at each side at the base, like the cross-piece of the handle of a sword. The oœcia are prominent, globose, and divided by a concentric smooth band, the part below which is finely granular, the part above being smooth, or with coarser granulations.

Explanation of Figure.

Plate 106.—Fig. 3, small portion of a specimen, magnified, showing an avicularium and two oœcia.

Plate 106, Fig. 4.

PYRIPORA CRASSA (McG.).

[Genus PYRIPORA (D'Orbigny). (Sub-kingd. Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Fam. Membraniporidæ.)

Gen. Char.—Zoarium adherent. Zoœcia distinct, thick, calcareous, convex, not separated by raised lines, narrowed below, in branched single series or forming continuous expansions; a large oblique aperture in front, filled by a thin membrane.]

Description.—Zoœcia large, much attenuated downwards, surface not annulated; aperture large, its margin thickened, with a thick, lip-like projection from the lower border.

Reference.—*Hippothoa crassa*, P. H. MacGillivray, Trans. Roy. Soc. Vict. 1868.

Queenscliff.

Differs from *P. catenularia* in the thick projection from the lower margin of the aperture, and from *P. polita* in the absence of the thick lateral masses.

Explanation of Figure.

Plate 106.—Fig. 4, portion of a specimen, magnified.

Pyripora forms a very natural genus, and was first proposed by D'Orbigny, but its species have generally been included in *Hippothoa*, with which it has no real connection, or in *Membranipora*. The chief distinction from the other Membraniporidæ consists in the zoœcia being very calcareous, thick, convex, much narrowed below, and not separated by raised margins. The habit also is to run in irregular, branching series.

Plate 106, Fig. 5.

PYRIPORA CATENULARIA (Jameson).

Description.—Zoœcia elongated, wide above, much narrowed below, arranged in linear or branching series, or occasionally aggregated; surface smooth or annulated; aperture oval or elliptical, occupying greater part of the expanded portion; margin flattened or bevelled, especially below.

References.—*Hippothoa catenularia*, Busk, Cat. Mar. Pol. Brit. Mus., pt. i., p. 29, pl. xviii., figs. 1, 2; *Membranipora catenularia*, Hincks, Brit. Mar. Pol., p. 134, pl. xvii., figs. 1, 2.

Port Phillip Heads; Brighton.

I can detect no difference between this and the common European form. In my specimens the bevelled margin of the aperture is frequently granular.

Explanation of Figure.

Plate 106.—Fig. 5, portion of a specimen in branching series, magnified.

Plate 106, Fig. 6.

PYRIPORA POLITA (Hincks).

Description.—Zoœcia very porcellanous, usually close together, narrowed downwards; aperture occupying about a third or more of the front; below the aperture a rounded or oval protuberance and on each side an oval or elliptical mass; sometimes these convexities are not distinctly marked, and there is occasionally a thickened collar all round the aperture, and there are sometimes several transverse markings across the front of the zoœcium.

Reference.—*Membranipora polita*, Hincks, Ann. and Mag. Nat. Hist., Nov. 1880.

Queenscliff, on *Cymodocea antarctica*.

Very conspicuous from the highly porcellaneous character of the zoœcia with their polished convexities. At the growing extremity of one specimen the zoœcia spread irregularly in the manner of *P. catenularia.* I have little doubt that this is the species described by Lamouroux as *Cellipora alata.*

EXPLANATION OF FIGURE.

PLATE 106.—Fig. 6, small portion of specimen, magnified.

PLATE 106, FIG. 7.

ELECTRA FLAGELLUM (McG.).

[Genus ELECTRA (LAMX.). (Sub-king. Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Fam. Membraniporidæ.)

Gen. Char.—Zoarium encrusting or filiform and erect. Zoœcia elongated, narrowed below, closely adherent together; lower part convex without distinct raised margins, perforated by numerous small foramina; aperture occupying the whole width of the zoœcium above, deep, with thick raised margins; one or more very large whip-like spines (occasionally replaced by an avicularium) below the margin of the aperture and a variable number of small sharp spines on its circumference.]

DESCRIPTION.—Zoœcia arranged in regular transverse series, elongate-quadrate; aperture occupying the whole width of the zoœcium above, its edge very prominent and thus causing the corresponding parts of the zoœcia to be separated by much-raised margins; lower part of zoœcium convex, surface closely pitted and extending a little further up one side than the other; a stout conical spine superiorly on each side; an enormous whip-like spine below the aperture to one side, and one or occasionally two small spines on the margin on the other side.

REFERENCE.—*Membranipora flagellum,* P. H. MacGillivray, Trans. Roy. Soc. Vict., Dec. 1881.

Queenscliff, on stems of *Cymodocea antarctica.*

The only species with which this can be confounded is *E. pilosa,* from which it differs in the arrangement of the zoœcia in regular transverse series, in the lower part being produced more up one side of the aperture, and in the long spine being to one side. The oral opening is situated very deeply. The upper margin of the zoœcium forms a deep arched vault against the base of that above, and is surrounded by a continuation of the thickened rim of the aperture. All my specimens present the same arrangement, which is also slightly seen in some specimens of *E. pilosa.* It is possibly oœcial, and may consequently not be constant.

The present species, *Membranipora pilosa* and *E. verticillata*, constitute a well-marked generic group. In all three the zoœcium is of the same structure, the lower part, separated from its neighbours by a groove, is convex, covered with oval puncta or depressions. The aperture occupies the whole width of the upper part of the zoœcium, its margins thickened and those of contiguous zoœcia closely united. One large spine seems to be nearly constant (sometimes replaced by an avicularium) below the aperture, and there are other smaller spines on different parts of the margin. In *E. verticillata* the cells are trumpet-shaped, and the aperture consequently very oblique.

Explanation of Figures.

Plate 106.—Figs. 7, 7*a*, portion magnified, the lower half the amplification of the upper.

Plate 106, Fig. 8.

BATHYPORA PORCELLANA (McG.).

[Genus BATHYPORA (McG.). (Sub-kingd. Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Fam. Membraniporidæ.)

Gen. Char.—Zoarium encrusting. Zoœcia in longitudinal series, quadrate, separated by raised lines; lower part calcareous, convex, much projecting, smooth and imperforate; aperture occupying the whole width of the upper part, deep, membranous, with a narrow smooth lamina below.]

Description.—The zoœcia are quadrate, separated by narrow raised margins; the upper half is occupied by a membranous area, the membrane being situated at a considerable depth, with the flap-shaped mouth at the upper end; the lower half is prominent, smooth, white, calcareous, rising higher than the separating margin. The upper end of the zoœcium is in the form of a broad shallow arch hollowed out in the base of the prominent portion of that above.

Reference.—*Membranipora porcellana*, P. H. MacGillivray, Trans. Roy. Soc. Vict., Nov. 1884.

Portland, Mr. Maplestone.

Explanation of Figures.

Plate 106.—Fig. 8, portion of specimen, magnified. Fig. 8*a*, small group of zoœcia, more highly magnified.

PLATE 106, FIG. 9.

BIFLUSTRA PAPULIFERA (McG.).

[Genus BIFLUSTRA (D'ORBIGNY). (Sub-king. Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Fam. Membraniporidæ.)

Gen. Char.—Zoarium encrusting or erect, foliaceous or cellular, uni- or bi-laminar; zoœcia depressed, elongated, separated by much raised, highly calcified, usually crenulated margins; aperture partially filled in below and occasionally on the sides by a calcareous usually granulated lamina, which generally slopes downwards from the margin.]

DESCRIPTION.—Zoarium encrusting. Zoœcia arranged in more or less regular, contiguous lines, narrowed below, oval; aperture very slightly filled in below; margin thickened, strongly crenulated, the lower part raised into a rounded prominence.

REFERENCE.—*Membranipora papulifera*, P. H. MacGillivray, Trans. Roy. Soc. Vict., Dec. 1881.

Port Phillip Heads, Mr. J. Bracebridge Wilson.

EXPLANATION OF FIGURE.

PLATE 106.—Fig. 9, group of zoœcia, magnified.

PLATE 106, FIG. 10.

BIFLUSTRA BIMAMILLATA (McG.).

DESCRIPTION.—Zoarium encrusting. Zoœcia elongated; aperture elliptical, the edge formed by a thickened, crenulated rim; the lower part of the aperture occupied by a large plate or denticle sloping backwards and usually with a fissure or notch on one side; front of the zoœcium formed by a calcareous granulated lamina sloping inwards to the aperture; at the lower part of the zoœcium are two rounded prominences or mamillæ, or occasionally only a single transversely elongated mass.

REFERENCE.—*Membranipora bimamillata*, P. H. MacGillivray, Trans. Roy. Soc. Vict., Nov. 1884.

The broad smooth plate at the lower part of the aperture is evidently of the same nature as the serrated denticle of *B. delicatula*.

EXPLANATION OF FIGURE.

PLATE 106.—Fig. 10, portion of specimen, magnified.

The descriptions and type specimens illustrated by this plate are from Mr. MacGillivray.

FREDERICK McCOY.

Cotenocottopsis
Calpodichon

1a
1b
1c
1
2
2a
3a
3b
3c
3

Plate 107, Fig. 1.

CATENICELLOPSIS PUSILLA (J. B. Wilson).

[Genus CATENICELLOPSIS (J. B. Wilson). (Sub-kingd. Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Fam. Catenicellidæ).

Gen. Char.—Polyzoary phytoid, erect, consisting of (usually) dichotomously divided, uniserial branches; cells all facing the same way, arising by short, corneous tubes from the upper and back part, or from the sides of other cells; cells at a bifurcation geminate, or a simple cell giving rise to the first of a series from its side; a small avicularium on either side superiorly.]

Description.—Cells ovoid; mouth lofty, arched above, straight below; a pair of long, blunt, hollow processes above the mouth, and another pair, shorter and thicker, opposite its lower part, with usually a minute avicularium at their bases externally; front with a rounded foramen below the mouth; surface smooth or minutely papillose; back smooth; ovicell immersed at the base of the upper of a group of three coalescent cells.

Reference.—J. Bracebridge Wilson, Tr. Mic. Soc. Vict. 1880.

Spring Creek, near Geelong, Mr. J. B. Wilson.

This species forms small glassy tufts, growing on other polyzoa and algæ. The cells are ovoid, slightly curved forwards. The mouth is lofty and slopes backwards. Above and behind the mouth is, on each side, a long, blunt, digitiform process, and more anteriorly, opposite its lower half, is a shorter, thicker, and usually curved, similar process, which frequently has a small avicularium on its outer aspect. On the front of the cell is a round or oval opening raised on a slight elevation. The cells usually extend in linear series from the upper and back part of those preceding; but they frequently originate by short, corneous tubes from their sides. The branches arise from the cells of a geminate pair, from the sides of single cells in a series, dichotomously from a single terminal cell, or in three series from a geminate pair. The ovicell is immersed in the base of the upper of a tricellate group, which is either terminal or at a bifurcation. It is covered with tubercles or raised pores.

Explanation of Figures.

Plate 107.—Fig. 1, specimen, natural size. Fig. 1*a*, small portion, magnified, showing tricellate group and ovicell. Fig. 1*b*, posterior view of the same. Fig. 1*c*, small portion, showing the origin of cells and branches from the sides of other cells.

PLATE 107, FIG. 2.

CATENICELLOPSIS DELICATULA (J. B. WILSON).

DESCRIPTION.—Cells elongated; mouth arched above, hollowed, slightly bulging below; on each side a broad avicularian process, directed outwards and forwards, extending from the summit of the cell to opposite the lower lip, and with a deep excavation lodging an avicularium; surface smooth; a short narrow, sub-lateral vitta on each side; posterior surface finely sulcate; ovicell globular, sub-immersed in the base of the upper of two coalescent cells.

REFERENCE.—J. Bracebridge Wilson, Tr. Mic. Soc. Vict. 1880.

Spring Creek, Mr. J. B. Wilson. Port Phillip Heads.

This, like the last, occurs in small, glassy, parasitic tufts. The cells are elongated, and have on each side a small sub-lateral vitta. There is also on each side a broad, lateral process, directed considerably forwards, the outer part of which has a deep cup containing an avicularium. The ovicell is cemented to the base of the upper of two coalescent cells, the lower of which has, in the place of the usual avicularian process, a stout, blunt, digitiform prolongation.

EXPLANATION OF FIGURES.

PLATE 107.—Fig. 2, specimen, natural size. Fig. 2*a*, small portion, magnified, showing ovicell and origin of three branches from a geminate pair.

I am doubtful whether *Catenicellopsis* ought to be separated from *Catenicella*. The character on which the genus has been founded is the frequent origin of the cells and branches from the sides of the cells, and not always from the summits of the cells of geminate pairs, as seems invariably to occur in the true *Catenicellæ*.

Plate 107, Fig. 3.

CALPIDIUM PONDEROSUM (Goldstein sp.).

[Genus CALPIDIUM (Busk). (Sub-kingd. Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Fam. Catenicellidæ.)

Gen. Char.—Polyzoary phytoid, erect, branched; branches consisting of series of cells all facing the same way, connected by corneous tubes; each internode consisting of a single cell, or of a median primary cell and a lateral, on one or both sides, united side to side; mouth contracted about the lower third, its upper margin very prominent and projecting; an avicularium on each upper angle of an internode.]

Description.—Polyzoary consisting of long, straggling branches; each internode containing a single cell, or two laterally coalescent; cells elongated, narrow, with five fenestræ on the front of each; an avicularium at each upper angle of the internodes; posterior surface with a vertical band, and two lateral pairs springing from it; ovicell large, galeate, terminal.

Reference.—*Catenicella ponderosa*, Goldstein, Tr. Mic. Soc. Vict. 1880.

Port Phillip Heads.

Forms tufts of considerable size. The branches are much more slender and straggling than in the next. Each internode usually consists of only a single cell, but very frequently there is also a coalescent one on the side. It is to be expected that a second lateral cell sometimes occurs, but I have not observed it in any of the specimens examined. The cells are long, and narrower than in *C. ornatum*. On the back, in the single-celled internodes, there is a vertical, thickened band, with a pair of similar bands extending from its lower part obliquely upwards and outwards to the edge, and another short pair going horizontally outwards from the upper part. The arrangement of the bands in the double-celled internodes varies. The ovicell is large, galeate, on the summit of a terminal cell. The cell on which it is situated is narrower and smaller than the others, and has the fenestræ more elongated. The posterior surface has some slightly elevated bands. The

external envelope is very calcareous and brittle, easily separating in fragments or as a shell from the internal parts, and then giving the appearance described and figured by Goldstein.

Explanation of Figures.

Plate 107 —Fig. 3. branch, natural size. Fig. 3*a*, portion, magnified, showing single- and double-celled internodes. Fig. 3*b*, back view of a portion of the same. Fig. 3*c*, small portion, more highly magnified, to show the form of the mouth.

The type specimens and descriptions of the species on this plate have been contributed by my friend Mr. MacGillivray.

Frederick McCoy.

* 108

Calpidium
Chlidonia

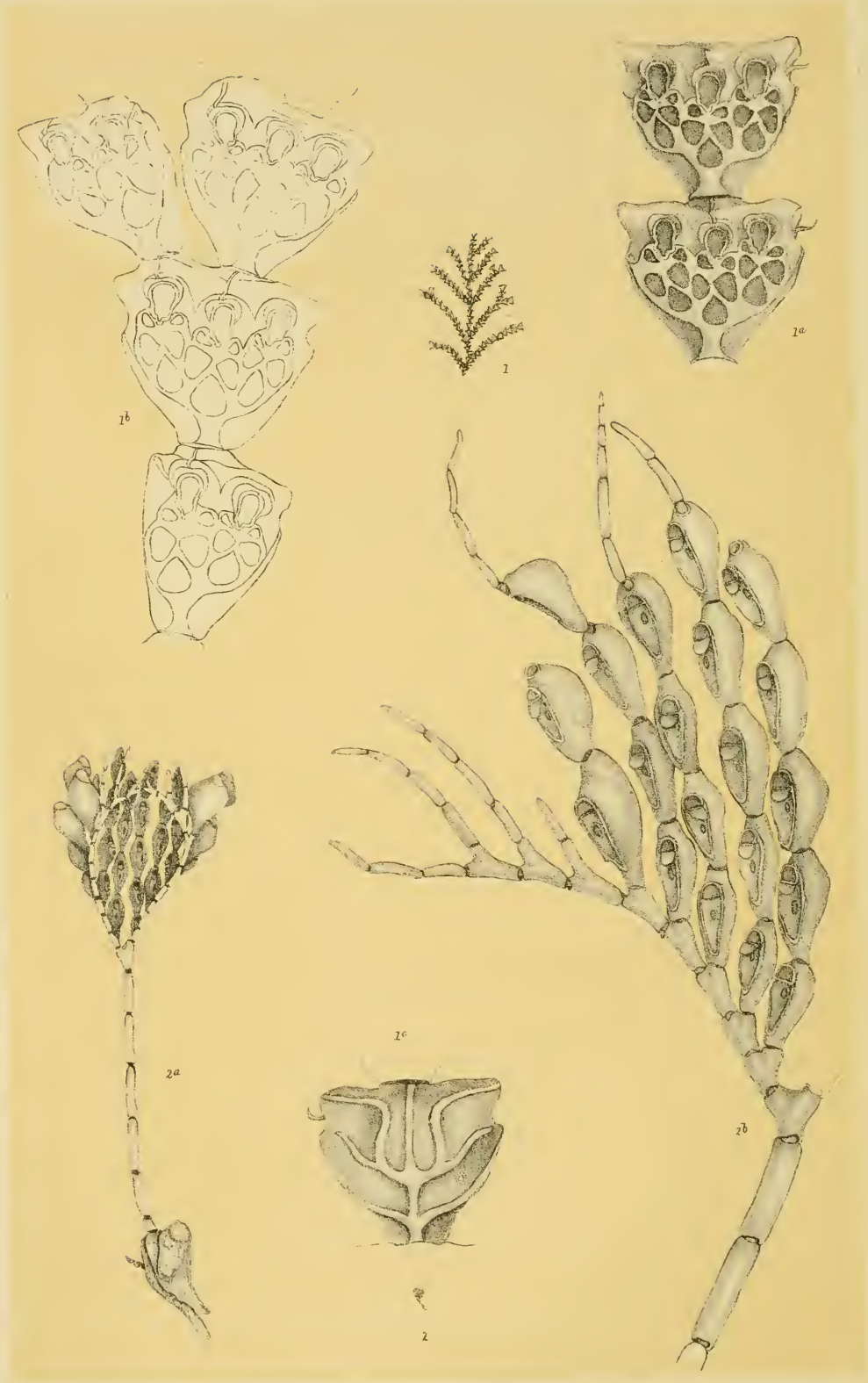

1a
1
1b
1c
2a
2b
2

Plate 108, Fig. 1.

CALPIDIUM ORNATUM (Busk).

Description.—Polyzoary consisting of broad, closely set branches; internodes of three, or occasionally of two, laterally coalescent cells; cells very large, with five large fenestræ on each; posterior surface with a central, thickened band, corresponding to the middle of the median cell, and two pairs of transverse bands going at right angles from this, the upper again dividing.

Reference.—Busk, Brit. Mus. Cat. Mar. Pol., p. 15, Pl. XII. and XIII.

Port Phillip Heads, seemingly very rare.

The only specimen I have, which I dredged in about 15 fathoms, forms a thick tuft, about 3 inches high. The branches are broad, closely set, flat, almost penniform in arrangement. The internodes, which are broad and urn-shaped, usually consist of three coalescent cells, but occasionally one lateral is wanting. At each upper angle, whether the internode consists of two or three cells, is a large avicularium. Almost the whole front of each cell is occupied by 5 fenestræ, separated by raised bands. The posterior surface is marked by a vertical, thickened band, corresponding to the central line of the median or primary cell; from this two pairs of bands are given off at right angles, the upper of which again gives off another branch, which ascends vertically and then turns horizontally outwards.

The ovicell, for specimens of which I am indebted to Mr. J. B. Wilson, very much resembles that of *Catenicella plagiostoma.* It is terminal, of great size, equalling in width the preceding tricellular internode, with the summit of the middle cell of which it is connected by a short tube. It is obscurely triangular in outline, with the apex produced into a simple, sharp, or bifid process. On the front is a prominent vertical ridge. The opening is very wide, looking downwards and slightly forwards; the margin is thickened, especially anteriorly, where it forms a broad collar. A specimen, which is unfortunately somewhat damaged, mounted in balsam, shows a shallow operculum with its

base supported by two calcareous processes rising vertically from the thickened posterior margin of the mouth.

It is at once distinguished from the last by its much larger size, more massive appearance, the usually tricellate internodes, and the different sculpture on the back.

EXPLANATION OF FIGURES.

PLATE 108.—Fig. 1, portion of branch, natural size. Fig. 1*a*, front view of two internodes, magnified. Fig. 1*b*, portion of branch in outline, to show internodes of two and of three cells. Fig. 1*c*, back of single internode.

The genus *Calpidium* was founded by Busk to contain *C. ornatum*, the character being that "it is distinguishable by the anomalous circumstance that each cell is furnished with two or more, usually with three distinct keyhole-shaped mouths, and is doubtless inhabited by three distinct individuals." The genus is a very marked and natural one, but the real distinction is not in the number but in the structure of the mouths. The mouth is lofty, contracted about the junction of the middle with the lower third; above this the margin is very prominent, and projects as a hood or collar, slightly hollowed in the centre above, from which point (in the median or primary cells) a narrow ridge runs upwards. Each internode consists of a primary cell, either single, or with an additional cell added on one or both sides. The cells of a series, except at a bifurcation, always arise from the summit of a primary cell. At a bifurcation in *C. ornatum* one branch springs from the primary cell, the other from one of the laterals, which has also a vertical ridge above the aperture; while in *C. ponderosum* both cells at a bifurcation have a similar ridge. In continuous series, where the internodes are double-celled, the secondary cell seems to be always developed on the same side. At each upper angle of the internode, whether consisting of 1, 2, or 3 cells, there is a considerable avicularium.

Catenicella aurita and *C. geminata* have the mouth of a similar shape, but destitute of the raised margin. They ought, I think, to be separated as a distinct genus.

PLATE 108, FIG. 2.

CHLIDONIA DÆDALA (WYV. THOMSON).

[Genus CHLIDONIA (SAVIGNY). (Sub-kingd. Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Fam. Chlidoniidæ.)

Gen. Char.—Polyzoary phytoid, erect, rising from a creeping stolon; cells in single series, rising from the joints of an articulated, non-celliferous stem, all opening the same way.]

DESCRIPTION.—The stem of each colony rises by a corneous tube from a disk on the dilatation of a creeping, anastomising stolon. It consists of a series of long, calcareous cylinders connected by corneous tubes. The upper internode divides into two, each division originating a branch extending in a curved direction outwards, upwards, and forwards. These are divided into calcareous internodes connected by corneous tubes, as in the primary stem. A certain number (2–7 or 8) of the internodes give origin superiorly to the first cells of an erect series. The lateral branch ends in a simple or divided tendril-like filament, jointed in the same manner. The cells are arranged in erect, linear series, each connected to the upper part of the preceding by a short, corneous tube. The number varies from 1 to 5 or 6 in each series, being greatest in those nearest the bifurcation of the central stem. The ultimate cell of each series usually gives rise at its summit to a tendril-like prolongation of similar structure to the extremities of the lateral branches. The cells are wide above, narrowed below, laterally compressed, and very much bulging posteriorly. The anterior surface is flattened, the greater part occupied by a thinner, depressed area separated by distinct margins. The large mouth, situated at the upper part, is rounded above and straight below. Below the mouth there is usually a small, round foramen. Some of the cells are much larger, but not otherwise different, and are probably ovicelligerous.

It is a very minute species growing on other polyzoa, chiefly *Bicellaria*. When extended, the whole has a very beautiful appearance, resembling a two-branched candelabrum.

It was made the type of a new genus by Wyville Thomson (Dubl. Nat. Hist. Rev. 1858), and described as *Cothurnicella dædala*. It is, however, exceedingly closely allied to the Mediterranean *Eucratea cordieri*, and will probably prove to be a luxuriant form of that species. As, however, the only specimen I have of the latter is not in a very good state of preservation, I am unable to decide positively. Waters's description (Ann. and Mag. Nat. Hist., Feb. 1879), the only one with which I am acquainted, would precisely apply to our species.

D'Orbigny (Paléontologie Française, and V. Bryozoaires, p. 40) first defines *Chlidonia*, referring to the name as given by Savigny

on one of his plates, and to Audouin's explanation of the plate as *Eucratea cordieri*. As priority seems to be with Savigny's name, and *Eucratea* has by different authors been made to include other species generically distinct (*Scruparia chelata*, *Alysidium Lafontii*, *Crisidia cornuta*), it is, I think, better to follow D'Orbigny.

Explanation of Figures.

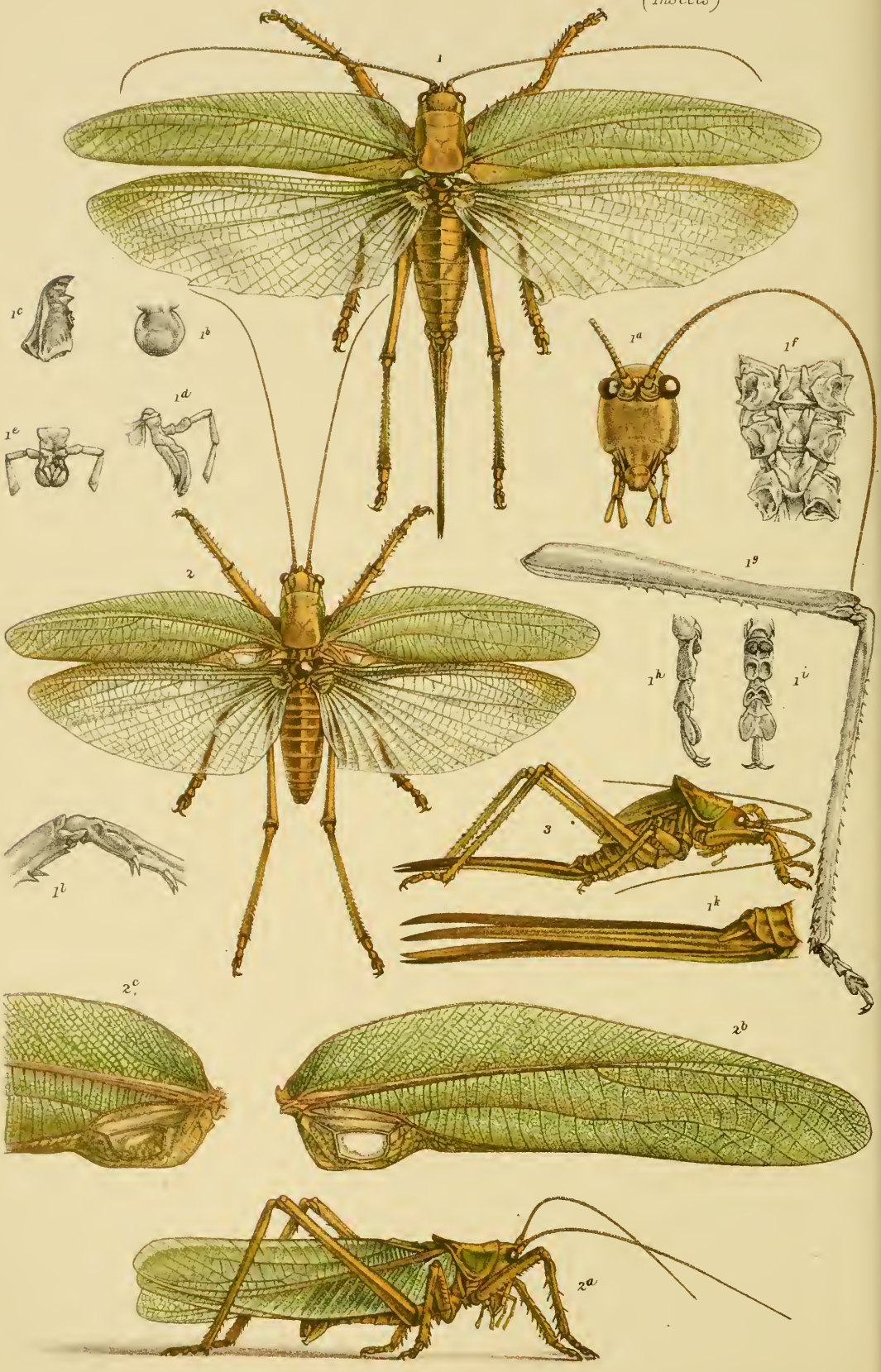
Plate 108.—Fig. 2. specimen, natural size. Fig. 2*a*, specimen, magnified. Fig. 2*b*, lateral half of another specimen, more highly magnified.

The specimens and descriptions of these two curious forms are from Mr. MacGillivray.

Frederick McCoy.

ZOOLOGY OF VICTORIA

(Insects)



D^r Wild del et lith. Prof^r M^c Coy dirx^t Steam Litho. Govt Printing Office

PLATE 109, FIGS. 1–3.

LOCUSTA VIGENTISSIMA (SERV.).

THE GREAT GREEN GUM-TREE GRASSHOPPER.

[Genus LOCUSTA (FABR.). (Sub-kingd. Articulata. Class Insecta. Order Orthoptera. Section Saltatoria. Fam. Gryllidæ).

Gen. Char.—Head vertical, front flattened, sides rounded, smooth, unridged, upper front margin projecting between bases of antennæ in a short, conical tubercle. Antennæ setaceous, longer than the body, closely approximated at base; 1st joint* as large as the frontal tubercle; 2nd joint short. Eyes globular; ocelli none. Labrum small, rounded at tip; mandible strong; maxillary palpi much longer than the labial; terminal joint scarcely, or but little, larger than the preceding, moderately widened at tip, and obliquely truncated. Legs long, slender; thighs very slender, slightly spinous below; anterior haunches with a curved spine on outer side; anterior pair of tibiæ in both sexes with a swelling on the outer side of the basal joint, containing a hollow which is in great part covered over with a semioval lobe; the 4 anterior tibiæ strongly spinous; posterior tibiæ with fine, close, numerous, minute spines on the two upper keels, in addition to those below; tarsi 4-jointed, the 3rd with 2 very large lobes, basal and 2nd joint with smaller lobes. Prothorax with a flat disc, obscurely keeled at the deflexed sides, a little narrowed in front; presternum with 2 long, straight, close spines; meso- and metasternum each divided longitudinally by a wide sulcus, each side bearing a conical, pointed tubercle. Tegmina long, rounded at tip, extending beyond the tip of the abdomen; stridulating spot of right one transparent and glossy in middle; hind wings equalling the tegmina in length. Abdominal appendages thick, short; sub-anal plate in male bent upwards, not extending beyond the abdomen, with lateral, setaceous appendages; ovipositor very long, narrow, straight, a little wider at base; valves 6, pointed, slightly hollowed above.]

DESCRIPTION.—*Male:* Head yellowish-brown, with a green patch on each side; tubercle between bases of antennæ conical, horizontal, divided by a mesial groove; front of head and labrum ferruginous tawny-yellow; maxillary and labial palpi green in most specimens. Eyes large, very prominent, yellowish-brown, mottled. Prothorax tawny-brown above, saddle-shaped, nearly smooth, with a few transverse lines above; deflected sides green, rugosely pitted, and wrinkled; each of the three segments of the sternum with 2 conical spines, those of the front segment most slender and acute. Tegmina, or anterior wings, dull "gum-leaf" green, with the longitudinal vein very thick, prominent, and yellowish-brown; stridulating, bright, mica-like organ at base of left (or upper, when at rest) tegmina, very large, iridescent, opaline, surrounded by ridged, rugged, yellowish-brown margins, that of right tegmina with very bright, central spot; hinder wings transparent, almost colorless, tinged with green, veins green, equalling the tegmina in length when at rest, and extending nearly half their length beyond the abdomen; under part of body and all the legs yellowish-brown, tinged with greenish below and at the joints above; femora of all the legs channelled below, the bounding ridges set each with a row of small spines, very much smaller on the posterior thighs than on the four anterior ones; keels of the tibiæ set with curved, sharp spines, much larger on the two anterior pairs than on the posterior pair; cavity in swollen base of anterior tibiæ reduced to a long, narrow slit; antennæ extending about one-fourth of their length beyond the end of abdomen, of a brownish color. Length of male from

* I notice a perforated papilla, or foramen, on the anterior or lower base of the basal joint of the antennæ, like the opening to the ears in the base of the large antennæ of the Macrourous crustacea, and these, I think, may also be the organs of hearing; the positions of which have not as yet been indicated in insects.

between eyes to end of abdomen, 1 in. 6 lines; length of each tegmina, 1 in. 11 lines, to 2 ins. 1 line; length of antennæ, 1 in. 11 lines; length of appendages, from bifid anal plate, about ½ line; length of two upper appendages, 1½ lines. The subpentagonal, horizontal, inner basal angle of tegmina containing the stridulating organ is about as long as the head and prothorax, and of the same brownish color in some, greenish in others; the rest of the tegmina abruptly deflexed. Proportional measurements: *Male*—Length of tegmina, 1 in. 10 lines; length from fore part of head to end of abdomen, $\frac{82}{100}$; length of antennæ, $\frac{99}{100}$; length of hind thigh, $\frac{60}{100}$. *Female:* Coloring as in the male, except the inner angles at base of tegmina, which are minutely reticulated, and of the same consistence and color as the rest of the tegmina. Length from base of antennæ to end of abdomen, excluding ovipositor, 1 in. 4 lines to 1 in. 7 lines; ovipositor, 1 in. 4 lines; appendages above base, 1 line; length of hind thigh, 1 in. 3 lines; length of hind tarsus, 1 in. 3 lines; length of each tegmina, 2 ins. 3½ lines; expanse from tip to tip, 4 ins. 6 lines; greatest width of tegmina, 6½ lines. Proportional measurements (length of tegmina taken as 100): greatest width of tegmina, $\frac{25}{100}$; length of hind wing, $\frac{91}{100}$; greatest width, $\frac{35}{100}$; length of antennæ, $\frac{95}{100}$; length of prothorax, $\frac{19}{100}$; length of ovipositor, $\frac{60}{100}$; length of hind thigh, $\frac{55}{100}$.

Reference.—Audinet Serville Hist. Nat. des Ins. Orthop., p. 530.

The family of *Gryllidæ*, or the Grasshoppers, is composed of a number of genera of insects often confounded with the *Locustidæ*, or the Locusts, to which they are most nearly allied, but from which they may be easily distinguished by the more slender body, the very long antennæ, exceeding the body in length, and the abdomen of the female being terminated by a very long, stiff, multivalve ovipositor, about as long as the abdomen; and the base of the anterior wings or elytra of the male having usually each a round talc-like spot (unsymmetrical, the right differing from that of the left side), for producing the peculiar chirping song or call for the female. This latter structure is surrounded with prominent veins, those of the under-side of the left one being most prominent and lying over the right one when the wings are closed; the sound being produced by rubbing the bases of the wing-cases one over the other. In the Grasshoppers generally the legs are long and slender, and the delicate wings usually extend far beyond the end of the abdomen when folded at rest. The anterior tibiæ of both legs have an oval pit closed by a talc-like plate in the slightly dilated base; the functions of these curious peculiarities being unknown, although Claus in his Lehrbuch der Zoologie suggests they may be the organs of hearing. This from their position and want of otolites is unlikely (and I have suggested the cavity opening in the basal joint of the antennæ to be the organ of

hearing as in the macrourous *crustacea*). The long ovipositor of the female is composed of six pieces, and can be thrust to its full depth into the earth, and then separated to allow the eggs to pass between them; the female after depositing a few eggs withdraws the ovipositor, and bores into another spot. Unlike the Locusts and the Field Crickets, which keep chiefly on the ground, the Grasshoppers frequent the branches of trees in moist places, feeding on the leaves, which they generally resemble in color; most species, therefore, being green, and not variegated with the gay colors so often seen in the Locusts. The Grasshoppers of any species are not so numerous as the Locusts in individuals, and—not forming swarms—are not dreaded as plagues.

The young, on escaping in spring from the egg laid in autumn, are like the parents, except in size, and wanting the wings. At first the two sexes are alike, but after the first moult (about two months old) the ovipositor of the female begins to grow. In the pupa condition they resemble the larvæ in shape and activity, but have rudimentary wings projecting a little way from the second and third joints of the thorax. Their hearing is very acute, as the males stop their song on the slightest noise.

It is unfortunate that the generic name *Locusta* should be applied to a highly typical group of Grasshoppers congeneric with the present fine species, differing altogether from the Locusts in the very long antennæ, long ovipositor of the females, and the stridulating, mica-like organ at base of tegmina of males. The generic name *Phasgonura*, applied to them by Prof. Westwood, has not the priority, or else it would be preferable.

The pupæ of the male and female resemble the adults, except that the elytra and wings are not more than half the length of the abdomen.

This *L. vigentissima* of Australia is so like the *L. viridissima* (Linn. sp.), or Great Green Grasshopper of France and England, in general appearance and many details of structure that it would be easy to mistake one for the other if the great difference of locality did not draw attention to the valid specific distinctions which really exist. It is one of the singularly close imitations

giving rise to the theory of representative species. It exemplifies the fact that one country of given temperature and other geographical characteristics may have indigenous animal inhabitants so nearly resembling in size, shape, color, and habits some inhabitants of an inaccessibly distant country of like character (without appearing in the intervening localities), that, each animal being suited to its surroundings, and those geographical circumstances being alike, one might fancy that the species should also be alike. As they certainly are not the same, the one species seems as if made on the pattern of the other, or to imitate it so nearly as to give rise to the general recognition of the fact involved in the theory of "Representative Species."

This fine Grasshopper is not very uncommon on gum-trees everywhere in Victoria, the male making a loud shrilling noise in summer. It has not been figured before.

Explanation of Figures.

Plate 109.—Fig. 1, female, natural size, in flying position. Fig. 1*a*, head, magnified two diameters, to show broad, smooth face without keels or ocelli. Fig. 1*b*, upper lip, magnified three diameters, to show simple, rounded edge. Fig. 1*c*, mandible, magnified three times, to show strongly-toothed edge. Fig. 1*d*, maxilla, magnified three times, to show bifid point, hood, and palpus. Fig. 1*e*, labium, magnified three times, to show quadrifid tips and palpi (these two figures accidentally inverted in lithographing). Fig. 1*f*, sternum, twice natural size, showing two conical spines on each segment between bases of legs. Fig. 1*g*, hind leg, twice natural size, showing smooth thigh. Fig. 1*h*, four-jointed tarsus, magnified three diameters, viewed sideways. Fig. 1*i*, ditto, viewed from below, showing division of basal joint, magnified three times. Fig. 1*k*, six-valved ovipositor of female, magnified two diameters, showing valves slightly separated, and the appendages at base. Fig. 1*l*, portion of anterior tibiæ, magnified three diameters, to show elongate drum at base, partly covered over by inflection of surface. Fig. 2, male in flying position, natural size. Fig. 2*a*, same, in resting position, side view. Fig. 2*b*, right elytron, or tegmen, of male, magnified two diameters, to show neuration, and the large, rounded, clear, talc-like spot of the stridulating organ at base, with the coarse, prominent ridges round it. Fig. 2*c*, portion of left elytron, similarly magnified, to show the difference of the stridulating organ. Fig. 3, female pupa, natural size, showing the shortness of elytra and wings, characteristic of the immature state.

Frederick McCoy.

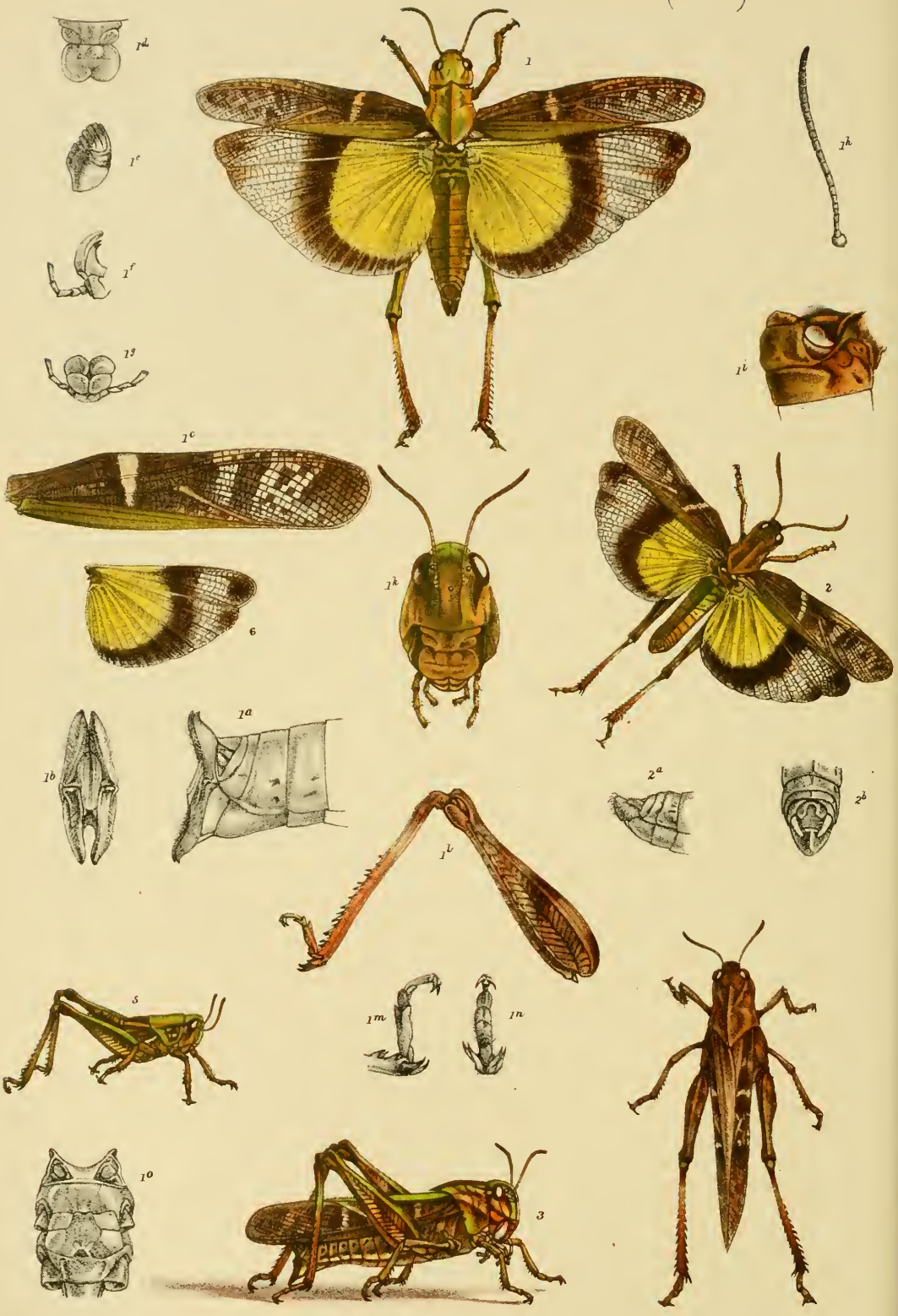

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PLATE 110, FIGS. 1–6.

ŒDIPODA MUSICA (FAB. SP.).

AUSTRALIAN YELLOW-WINGED LOCUST.

[Genus ŒDIPODA (LATR.). (Sub-kingd. Articulata. Class Insecta. Order Orthoptera. Section Saltatoria. Fam. Locustidæ.)

Gen. Char.—Head vertical, or nearly so; anterior face convex, with four vertical keels, two median close, outer ones lateral; eyes large, oval; ocelli three, one between the two median keels, below base of antennæ, and the others at inner edge of eye between the median and lateral keels, above the base of the antennæ. Antennæ multiarticulate; joints indistinct, cylindrical, shorter than head and thorax. Prothorax moderate; disc flat, with a median keel and another, less distinct, on each side; anterior half transversely striated. Three sternal pieces between the legs, wide, not armed with spines, smooth, flattened. Feet moderate; four anterior tibiæ, spinose below; posterior pair with two rows of spines above, except at base; tarsi 3-jointed, with first joint longest, divided into 3 parts below, the last joint with a very small cushion between the claws. Abdomen thick, long, moderately compressed, terminated by four short, pointed pieces, in the female; sub-anal plate of male extending slightly beyond the end of the abdomen, triangular, pointed, and a little curved upwards, convex below; abdominal appendages short, setaceous. Anterior wings, or tegmina, usually longer than the abdomen, opaque towards the base, with all the transverse nervures almost equally fine, anterior margin narrow; never dilated nor transparent; posterior wings usually nearly as long as the tegmina.]

DESCRIPTION.—Head brownish- or yellowish-green, a polished, black, triangular spot below the eye and outside the outer keel and the base of the antennæ; mandibles bluish at base, with black tips; prothorax brownish in front, pea-green behind in most specimens, but occasionally dark brown; keel dark brown, and one or two black blotches on sides; tegmina extending beyond the abdomen when at rest, basal half of posterior margin nearly opaque and pea-green in most specimens, brown in others, middle and anterior portions dark brown, with one conspicuous, narrow, transverse, whitish, transparent band about one-third of length from base, with an imperfect, similar band or spot about half-way between base and tip; distal half more transparent, irregularly mottled with transparent, pale brown, irregular spots and dark brown nervures. Posterior wings a little shorter than tegmina, with basal half rich sulphur-yellow, with a slight greenish tinge, beyond which is a broad, brownish-black, opaque band curving from middle of anterior edge to anal angle, where it narrows; beyond this, the wings are transparent, nearly colorless, with brown nervures and a few dusky spots near tip, but very variable, sometimes forming a large, cloudy, apical spot. Abdomen, antennæ, and anterior feet greenish tawny-brown; inferior groove of hind thigh bright red; tarsi and tibiæ dull red, with a yellowish band near base of tibiæ; thighs greenish, with a large blackish, dull red, or purple transverse band on inner side. Length, 1 in. 5 to 6 lines; length of tegmina, 1 in. 2 lines to 1 in. 6 lines; width of thorax between bases of tegmina, 3 lines; length of hind wing, 1 in. $1\frac{1}{2}$ lines; length of antennæ, $5\frac{1}{2}$ lines; male smaller and with proportionately longer antennæ, otherwise similar to females, length 1 in. 1 line; length of antennæ, $5\frac{1}{2}$ lines. Proportionate measurements—*Female* (large specimen): length, 1 in. 7 lines; tegmina, $\frac{20}{100}$; hind wing, $\frac{87}{100}$; antennæ, $\frac{30}{100}$. *Male:* Length, 1 in. $1\frac{1}{2}$ lines; tegmina, $\frac{90}{100}$; hind wing, $\frac{87}{100}$; antennæ, $\frac{+3}{100}$. *Vars.*—The coloring varies considerably, especially in the proportion of green and brown on the head and thorax, the darkness of the brown mottling on the tegmina

and the greater or less distinctness of the mottling or obscurity of the tip of the hind wings. The two most distinct and persistent varieties are the common one, with thorax, and hind margin of tegmina, pea-green, and the other with those parts testaceous brown. The green is also sometimes absent from the thighs, which are then brown, irregularly banded with darker. In other respects the varieties agree.

Reference.—*Gryllus musicus,* Fabr. Ent. Syst., v. 2, p. 55 = *Gryllus pictus,* Leach, Zool. Misc., v. 1, t. 25.

The family *Locustidæ*, or the true Locusts, embracing all the migratory sorts, includes a number of genera differing from the *Gryllidæ*, or Grasshoppers, in the females not having the long exserted ovipositor; and in having the antennæ short, not half the length of the body, and of only 20 to 30 joints, and either cylindrical or fusiform or clavate in shape. The head has three ocelli, or small simple eyes, usually, but never less than one, while they are absent in the Grasshoppers. The tarsi are only 3-jointed, instead of 4-jointed as in the Grasshoppers. The wings in the Locusts never have the talc-like, eye-like stridulating organ at the base of the right anterior wing or tegmen of the male, but produce their song, or shirring chirp, by the totally different method of rubbing the hind femora and tibiæ against the hard anterior edge of the deflexed anterior wings or tegmina, the insect standing on the four anterior legs while rapidly scraping the thighs up and down like the bow of a fiddle against the raised edge of the wing-covers; the thigh of one side being used alternately with that of the other.

Connected apparently with this mode of singing is another structural peculiarity found in all Locusts (of both sexes), and not in Grasshoppers; this is a semi-oval drum-like cavity (see our Fig. 1*i*) just above and behind the base of the hind leg on each side in the last thoracic segment, with a bright reflecting internal plate partially crossing the cavity; the whole apparently intended to increase the resonance of the sound produced by the scraping of the hind legs on the wing-case edge.

The great size of the muscular thighs of the posterior pair of feet enables the Locusts to jump much higher, further, and more readily than the Grasshoppers, giving an example of muscular power almost unparalleled in the animal kingdom. The hind legs are not used for walking, which is effected by the four anterior feet,

the great jumping posterior pair being held up in ordinary slow walking. This is perhaps the reason why Moses counts the locusts amongst four-footed animals that may be eaten.

The long boring ovipositor of the Grasshoppers is replaced in the Locusts by four short conical plates, two above and two below, the upper ones a little concave above, the lower conoidal. Another general peculiarity of the *Locustidæ* in which they differ from the Grasshoppers is the great width of the middle and hinder sternal pieces of the thorax, separating widely the middle and hinder legs of the right side from those of the left side.

The wonderful migrations of countless millions of individuals of several species of this group—the Locusts—at certain times of the year, in various countries, especially North Africa, Arabia, India, China, and even the warm parts of Europe, have been the subjects of records the most ancient, interesting, and important of all popular references to insects. In most of the countries named, the flights or migrations are approximately from E. to W. (in Victoria they are generally from N. to S.), chiefly carried on by the action of strong winds blowing at the time, as the power of the wings for flight is not great, and the creatures seem to have little or no power of directing their flight, so that the great clouds of locusts raised, and mainly carried, by the wind are unable to avoid a river in their course ; and as each individual's flight is for the most part short, the insects falling into such rivers are in many cases described as forming putrefying heaps of dead bodies many feet high and many miles long, creating a pestilence, while the flight itself often darkens the noon-day sky so that one could not see to read in the houses for hours. When they all alight, as they do at sundown, every trace of green vegetation disappears as if by magic, from the action of their voracious jaws, the places where they pass seeming as if burnt up—the Latin name *Locusta* being derived *(locis ustis)* from the parched arid appearance wherever they have been. In nearly all ancient writers the popular or local names of Locusts have reference to their appearance in myriads, or their destructive voracity. For instance, the old Hebrew name for these, *Arbeh*, refers to their multitude at the times of migration ; in Sanskrit,

Patanga, refers to the jumping and advancing of the swarms; the Chinese names have all the same meaning; the Greek, ακρις, refers to the belief that they came from the tops of the mountains; and the Arabic, *Djarâdoun*, is from their gnawing or plucking away every green thing.

The astonishing multitudes of individuals which appear at one time, and apparently march or fly over the land nearly in one direction, constitute in all countries a constant character of these scourges or plagues, and is not clearly explicable at present. The passage is only partially effected by the wings, which are only capable of holding up the body for a short distance; the prevailing winds are really the most powerful agents for carrying forward these clouds of Locusts, described by all observers; and it is entirely to the power of currents high in the air that the passage of clouds of Locusts over hundreds of miles of sea is sometimes observed when they fall on ships at sea hundreds of miles from land.

The eggs are generally deposited in autumn in the earth, in parcels of fifty or sixty, slightly glued together. In spring the young appear without tegmina or wings; and, jumping with the hind legs, or walking slowly with the four anterior ones, increase in size, and devour most kinds of vegetation, with a gradual development of wings at each moult or change of skin, until the autumn, when the flights or migrations take place on the perfection of the wings of a considerable proportion of the individuals. These are always accompanied by a multitude of imperfect younger individuals with short, undeveloped wings, travelling as pedestrians—the "Füssgangers," as the Germans, and the Dutch Boers in Africa, call them.

Prepared in various ways, the Locusts make good food, especially if mixed with honey, which makes them more easy of digestion; some nations boiling them with butter; others roasting the bodies, after taking off the legs and wings, and, with the addition of salt, either eating them fresh or potting them up preserved for future use. Sparmann mentions how fat the delighted Hottentots grow when the Locusts arrive in due season. Many of the lower animals, birds, and mammals, even lions, feed largely on them.

As Fabricius does not mention the color of the wings of his *G. musicus*, and subsequent writers have quoted that species also from India and the Cape of Good Hope, where I do not think the Australian species occurs; while, on the other hand, Leach's *G. pictus* is unmistakably our insect, and has never been quoted from any other country, I should have been glad to use Leach's specific name, if it were not certain that Sir Joseph Banks's specimen was our species, and Fabricius's name, founded on that specimen, has the priority.

Very common everywhere in Victoria in the latter part of the summer.

Explanation of Figures.

Plate 110.—Fig. 1, female, natural size, flying. Fig. 1*a*, side view of end of abdomen of ditto, magnified three diameters, showing the down-turned lower pair of appendages and up-turned upper pair of oviducal plates. Fig. 1*b*, end view of ditto. Fig. 1*c*, tegmen or anterior wing, magnified twice, to show veining and absence of stridulating organ at base. Fig. 1*d*, bilobed upper lip or labrum, magnified three diameters. Fig. 1*e*, powerful, serrated first jaw or mandible, magnified three diameters. Fig. 1*f*, slender, bidentate maxilla or second jaw, with hood and 5-jointed palpus, magnified three diameters. Fig. 1*g*, lower lip or labium, with 4-jointed palpi. Fig. 1*h*, one of the antennæ, magnified three diameters. Fig. 1*i*, side view of anterior segments of abdomen, to show the stridulating cavity, with its tense membranous cover over base of hind legs, magnified three diameters. Fig. 1*k*, front view of head, to show the four vertical keels and position of the three stemmata, or small simple eyes, magnified two diameters. Fig. 1*l*, hind leg, magnified two diameters, to show the chevron-grooving. Fig. 1*m*, side view of 3-jointed tarsi, magnified three diameters. Fig. 1*n*, under view of ditto, to show apparent division of the basal joint. Fig. 1*o*, sternum with bases of six legs, to show wide, flat, smooth, middle and hind segments, and narrow, unarmed front joint. Fig. 2, male, natural size, flying, to show its smaller size and proportionally longer antennæ. Fig. 2*a*, side view of end of abdomen of male, magnified three diameters, to show the upward-curved sub-anal plate and small appendages. Fig. 2*b*, ditto, viewed from above, showing pair of small appendages with up-turned end of sub-anal plate between them. Fig. 3, female, natural size, side view. Fig. 4, female, natural size, viewed from above, of variety, with thorax and basal or inner margin of tegmina brown, to show the overlapping of the left anterior wing upon the right when at rest. Fig. 5, pupa, natural size, to show short wings and tegmina. Fig. 6, hind wing, natural size, of very small specimen, to show range of dimensions.

Frederick McCoy.

CONTENTS OF DECADES.

N.B.—The originals of all the Figures are in the National Museum, Melbourne.

DECADE I.

PLATE 1.—The Black Snake (Pseudechys porphyriacus, Shaw sp.).
PLATE 2.—The Copper-head Snake (Hoplocephalus superbus, Günth.).
PLATE 3.—The Tiger Snake (Hoplocephalus curtus, Schl. sp.).
PLATE 4.—The Australian Bream (Chrysophrys Australis, Günth.).
PLATE 5.—The Spiny-sided Butterfly-Gurnard (Lepidotrigla Vanessa, Rich. sp.).
PLATE 6.—The Kumu Gurnard (Trigla Kumu, Lesson and Garn.).
PLATE 7.—The Australian Giant Earth-worm (Megascolides Australis, McCoy).
PLATE 8.—Lewin's Day-moth (Agarista Lewini, Boisd.).
The Loranthus Day-moth (Agarista Casuarinæ, Scott).
The Vine Day-moth (Agarista Glycine, Lewin sp.).
PLATE 9.—Pieris (Thyca) Harpalyce (Don. sp.).
PLATE 10.—Pieris (Thyca) Aganippe (Don. sp.).

DECADE II.

PLATE 11.—The Little Whip Snake (Hoplocephalus flagellum, McCoy). The White-lipped Snake (Hoplocephalus coronoides, Günth.).
PLATE 12.—The Death Adder (Acanthophis Antarctica, Shaw sp.).
PLATE 13.—The Carpet Snake (Morelia variegata, Gray).
PLATE 14.—The Gippsland Perch (Lates colonorum, Günth.).
PLATE 15.—The Murray Lobster (Astacoides serratus, Shaw sp.).
PLATE 16.—The Salmon Arripis (Arripis truttaceus, Cuv. sp.). Adult.
PLATE 17.—Ditto of the younger forms and coloring.
PLATE 18.—The Horse Mackerel (Trachurus trachurus, Lin. sp.).
PLATE 19.—The Small-scaled Rock Cod (Lotella callarias, Günth.).
PLATE 20.—The Australian Rock Cod (Pseudophysis barbatus, Günth.).

DECADE III.

PLATE 21.—The Sea-Leopard Seal (Stenorhynchus leptonyx, de Blainv. sp.).
PLATE 22.—The Yellow-sided Dolphin (Delphinus Novæ Zealandiæ, Quoy and Gaim.).
PLATE 23.—The Common Brown Snake (Diemenia superciliosa, Fisch.).
The Small-scaled Brown Snake (Diemenia microlepidota, McCoy).
The Shield-fronted Brown Snake (Diemenia aspidorhyncha, McCoy).
PLATE 24.—Catenicella margaritacea (Busk).—C. plagiostoma (Busk).—C. ventricosa (Busk).—C. hastata (Busk.)—C. rufa (McG.).—C. cribraria (Busk).—C. alata (Wyv. Thomson).—C. lorica (Busk).—C. formosa (Busk).—C. elegans (Busk).—C. perforata (Busk).—C. Buskii (Wyv. Thomson).—C. Hannafordi (McG.).—C. crystallina (Wyv. Thomson).—C. carinata (Busk).—C. aurita (Busk).—C. geminata (Wyv. Thomson).—C. cornuta (Busk).—C. intermedia (McG.)
PLATE 25.—Membranipora membranacea (Linn. sp.).—M. perforata (McG.).—M. ciliata (McG.).—M. mamillaris (McG.).—M. umbonata (Busk).—M. pilosa (Linn. sp.).—M. cervicornis (Busk).
PLATE 26.—Membranipora dispar (McG.).—M. Woodsii (McG.).—M. lineata (Linn. sp.).—M. Rosselii (Audouin sp.).—M. Lacroixii (Savigny sp.).
PLATE 27.—The Australian Rockling (Genypterus Australis, Cast.).
The Yarra Blackfish (Gadopsis gracilis, McCoy).
PLATE 28.—The Southern Mackerel (Scomber pneumatophorus, De la Roche).
PLATE 29.—The Yabber Crayfish (Astacoides bicarinatus, Gray sp.).
PLATE 30.—The Large Wattle Goat-Moth (Zeuzera Eucalypti, Boisd. Herr.-Schæf.).

DECADE IV.

PLATE 31.—The Australian Sea-Bear or Fur-Seal (Euotaria cinerea, Péron sp.).
PLATE 32.—The Two-hooded Furina-Snake, Furina bicucullata (McCoy).
PLATE 33.—The Banded Red Gurnet-Perch (Sebastes percoides, Solander sp.).
PLATE 34.—The Angel-fish (Rhina squatina, Lin. sp.).
PLATE 35.—Lepralia circinata (McG.).—L. Cecilii (Aud.).—L. diaphana (McG.).—L. marsupium (McG.).—L. subimmersa (McG.).—L. anceps (McG.).—L. Maplestonei (McG.).
PLATE 36.—Lepralia vittata (McG.).—Membranipora perforata. Lepralia Brogniartii (Aud.).—L. elegans (McG.).—L. pertusa (Esper. sp.).—L. Malusii (Aud. sp.).—L. lunata (McG.).
PLATE 37.—Lepralia ciliata (Linn. sp.).—L. trifolium (McG.).—L. cheilodon (McG.).—L. canaliculata (McG.).—L. larvalis (McG.).—L. diadema (McG.).—L. papillifera (McG.).—L. Ellerii (McG.).
PLATE 38.—Lepralia monoceros (Busk).—L. excavata (McG.).—L. vitrea (McG.).—L. megasoma (McG.).—L. Schizostoma (McG.).—L. Botryoides (McG.).—L. ferox (McG.).—L. pellucida (McG.).
PLATE 39.—Crisia Edwardsiana (D'Orb. sp.).—C. biciliata (McG.).—C. acropora (Busk).—C. setosa (McG.).—C. tenuis (McG.).
PLATE 40.—Saunders' Case-Moth (Metura elongata, Saunders sp.).
The Lictor Case-Moth (Entometa ignobilis, Walk.).

DECADE V.

PLATE 41.—The Lace Lizard (Hydrosaurus varius, Shaw sp.).
PLATE 42.—The Spotted Marsh-Frog (Limnodynastes Tasmaniensis, Günth.).—The Common Sand-Frog (Limnodynastes dorsalis, Gray).
PLATE 43.—The Carpet Shark (Crossorhinus barbatus, Lin. sp.).—The Seven-gilled Shark (Notidanus [Heptanchus] Indicus, Cuv.).
PLATE 44.—The Barracouta (Thersites atun, Cuv.).—The Tunny (Thynnus Thynnus, Lin. sp.).
PLATE 45.—Flustra denticulata (Busk).—Carbasea episcopalis (Busk).—C. dissimilis (Busk).—C. indivisa (Busk).—C. elegans (Busk).—C. pisciformis (Busk).
PLATE 46.—Spiralaria florea (Busk).—Diachoris Magellanica (Busk).—D. spinigera (P. McGil.).—Dimetopia spicata (Busk).—D. cornuta (Busk).—Didymia simplex (Busk).—Calwellia bicornis (Wyv. Thomson).
PLATE 47.—Dictyopora cellulosa (P. McGil.).
PLATE 48.—Eschara obliqua (P. McGil.).—E. dispar (P. McGil).—E. gracilis (Lamx.).—E. platalea (Busk).—E. quadrata (P. McGil.)—E. mucronata (P. McGil.).—Caleschara denticulata (P. McGil.).
PLATE 49.—Cellaria fistulosa (Linn.).—C. hirsuta (P. McGil.).—C. tenuirostris (Busk.).—C. gracilis (Busk).—Nellia oculata (Busk).—Tubucellaria hirsuta (Busk).
PLATE 50.—The Great Black, or Manna Cicada (Cicada mœrens, Germ.).—The Great Green Cicada (Cyclochila Australasiæ, Donov. sp.).

DECADE VI.

PLATE 51.—The Victorian Rhodona (Rhodona Officeri, McCoy).
PLATE 52.—The Black and White Ringed Snake (Vermicella annulata, Gray).
PLATE 53.—The Green and Golden Bell-Frog (Ranoidea aurea, Less. sp.).
PLATES 54–55.—The Australian Aulopus (Aulopus purpurisatus, Rich.).
PLATE 56.—The Hammer-headed Shark (Zygæna malleus, Shaw).—The Common Australian Saw-Fish (Pristiophorus nudipinnis, Günth.).
PLATE 57.—Biflustra perfragilis (McGil.).—B. delicatula (Busk).
PLATE 58.—Cellularia cuspidata (Busk).—Menipea crystallina (Gray sp.).—M. cyathus (Wyv. Thomson).—M. cervicornis (McGil.)—M. tricellata (Busk).—M. Buskii (Wyv. Thomson).
PLATE 59.—Bicellaria tuba (Busk).—B. grandis (Busk).—B. ciliata (Linn).—B. turbinata (McGil.).—Stirparia annulata (Map.).—Bugula neritina (Linn.).
PLATE 60.—Steganoporella magnilabris (Busk. sp.).—Petralia undata (McGil.).

DECADE VII.

PLATE 61.—The Tuberculated Argonaut (Argonauta oryzata, Meusch.).
PLATE 62.—The same seated in its so-called shell or Paper-Nautilus.
PLATE 63.—The Blue-spotted Eagle-Ray (Myliobatis Australis, Macleay).
PLATE 64.—The Long-toothed Bull-Shark (Odontaspis taurus, Raf.).—The Australian Tope Shark (Galeus Australis, Macleay).
PLATE 65 —The Leafy Sea-Dragon (Phyllopteryx foliatus, Shaw sp.).—The Short-headed Sea-horse (Hippocampus breviceps, Pet.)
PLATE 66.—Dictyopora grisea (Lamx. sp.).—D. albida (Kirch.)—(Var. avicularis, P. McGill.).
PLATE 67.—D. Wilsoni (P. McGill.).
PLATE 68.—Idmonea Milneana (d'Orb.).—I. contorta (P. McGill.).—I. radians (Lamk.).
PLATES 69–70.—The Violet-shouldered Phasma (Tropidoderus iodomus, McCoy).—The Red-shouldered Phasma (Tropidoderus rhodomus, McCoy).

DECADE VIII.

PLATE 71.—The Australian Sea-Bear or Fur-Seal (Euotaria cinerea, Péron sp.).
PLATE 72.—The Northern Blue-tongued Lizard (Cyclodus gigas, Bodd. sp.).
PLATE 73.—The Ludrick (Girella simplex, Rich. sp.).
PLATE 74.—The White Shark (Carcharodon Rondeletii, Müll. and Hen.).
PLATE 75.—The Picked Dog-Fish (Acanthias vulgaris, Linn. sp.).
PLATES 76–77.—The Australian Tooth-cupped Cuttlefish (Sepioteuthis Australis, Quoy and Gaim.).
PLATE 78.—Bugula robusta (P. McGil.).—B. cucullata (Busk).—B. dentata (Lamx.).—B. avicularia (Pall.).
PLATE 79.—The Violet-winged Phasma (Acrophylla violascens, Leach sp.).
PLATE 80.—The Large Pink-winged Phasma (Podacanthus typhon, Gray).

DECADE IX.

PLATE 81.—The Gippsland Water Lizard (Physignathus Lesueri, Gray)—(Var. Howitti, McCoy).
PLATES 82–83.—The Murray Tortoise (Chelymys Macquaria, Cuv. sp.).
PLATE 84.—The Murray Golden Perch (Ctenolates ambiguus, Rich. sp.).
PLATES 85–86.—The Murray Cod-Perch (Oligorus Macquariensis, Cuv. and Val. sp.).
PLATE 87.—The Australian Smooth-Hound (Mustelus Antarcticus, Günth.).
PLATE 88.—The Thresher, or Long-tailed Shark (Alopecias vulpes, Linn. sp.).
PLATE 89.—Catenicella intermedia (P. McG.).—C. amphora (Busk).—C. Wilsoni (P. McG.).—C. pulchella (Map.).—C. utriculus (P. McG.).
PLATE 90.—Catenicella fusca (P. McG.).—C. umbonata (Busk).—C. cornuta (Busk).

DECADE X.

PLATE 91.—Gymnobelideus Leadbeateri (McCoy).
PLATES 92–93.—The Long-necked River Tortoise (Chelodina longicollis, Shaw sp.).
PLATE 94.—Opercula of Retepora.
PLATE 95.—Retepora porcellana (P. McGil.).—R. avicularis (P. McGil.).—R. fissa (P. McGil.).
PLATE 96.—Retepora monilifera (P. McGil.).
PLATE 97.—Retepora monilifera (P. McGil.).—R. formosa (P. McGil.).—R. carinata (P. McGil.).
PLATE 98.—Retepora Phœnicea (Busk).—R. aurantiaca (P. McGil.).
PLATE 99.—Retepora granulata (P. McGil.).—R. tessellata (Hincks).—R. serrata (P. McGil.).
PLATE 100.—Goniocidaris tubaria (Lam.).

The foregoing ten Decades form Vol. I.

DECADE XI.

PLATE 101.—The Luth, or Leathery Turtle (Sphargis coriacea, Linn. sp.).
PLATE 102.—The Rugged Stump-tail, or Shingle-back, Lizard (Trachydosaurus rugosus, Gray).
PLATE 103.—The Blackish Australian Worm-Snake (Typhlops nigrescens, Gray sp.).
PLATE 104.—The Basking Shark (Cetorhinus maximus, Linn. sp.).
PLATE 105.—Cellaria rigida (McG.).—Tubucellaria cereoides (Ellis and Solander).—Urceolipora dentata (McG.)—U. nana (McG.).
PLATE 106.—Amphiblestrum punctigerum (Hincks). — A. Flemingii (Busk). — A. permunitum (Hincks).—Pyripora crassa (McG.).—P. catenularia (Jameson).—P. polita (Hincks).—Electra flagellum (McG.). — Bathypora porcellana (McG.).—Biflustra papulifera (McG.).—B. bimamillata (McG.).
PLATE 107.—Catenicellopsis pusilla (J. B. Wilson). — C. delicatula (J. B. Wilson). — Calpidium ponderosum (Goldstein sp.).
PLATE 108.—Calpidium ornatum (Busk).—Chlidonia dædala (Wyv. Thomson).
PLATE 109.—The Great Green Gum-tree Grasshopper (Locusta vigentissima, Serv.).
PLATE 110.—The Australian Yellow-winged Locust (Œdipoda musica, Fab. sp.).

CONTENTS OF DECADE XI.

N.B.—The originals of all the Figures are in the National Museum, Melbourne.

PLATE 101.—The Luth, or Leathery Turtle (Sphargis coriacea, Linn. sp.).

PLATE 102.—The Rugged Stump-tail, or Shingle-back, Lizard (Trachydosaurus rugosus, Gray).

PLATE 103.—The Blackish Australian Worm-Snake (Typhlops nigrescens, Gray sp.).

PLATE 104.—The Basking Shark (Cetorhinus maximus, Linn. sp.).

PLATE 105.—Cellaria rigida (McG.).—Tubucellaria cereoides (Ellis and Solander).—Urceolipora dentata (McG.).—U. nana (McG.).

PLATE 106.—Amphiblestrum punctigerum (Hincks).—A. Flemingii (Busk).—A. permunitum (Hincks).—Pyripora crassa (McG.).—P. catenularia (Jameson)—P. polita (Hincks).—Electra flagellum (McG.).—Bathypora porcellana (McG.).—Biflustra papulifera (McG.).—B. bimamillata (McG.).

PLATE 107.—Catenicellopsis pusilla (J. B. Wilson).—C. delicatula (J. B. Wilson).—Calpidium ponderosum (Goldstein sp.).

PLATE 108.—Calpidium ornatum (Busk).—Chlidonia dædala (Wyv. Thomson).

PLATE 109.—The Great Green Gum-tree Grasshopper (Locusta vigentissima, Serv.).

PLATE 110.—The Australian Yellow-winged Locust (Œdipoda musica, Fab. sp.).

MARY D. ROGICK.

Natural History of Victoria.

PRODROMUS

OF THE

ZOOLOGY OF VICTORIA;

OR,

FIGURES AND DESCRIPTIONS OF THE LIVING SPECIES OF ALL CLASSES

OF THE

VICTORIAN INDIGENOUS ANIMALS.

DECADE XII.

BY

FREDERICK McCOY, F.R.S.,

HONORARY MEMBER OF THE CAMBRIDGE PHILOSOPHICAL SOCIETY; HONORARY ACTIVE MEMBER OF THE IMPERIAL SOCIETY OF NATURALISTS OF MOSCOW; CORRESPONDING MEMBER OF THE ZOOLOGICAL SOCIETY OF LONDON; HONORARY MEMBER OF THE ROYAL SOCIETY OF NEW SOUTH WALES; HONORARY FELLOW OF THE GEOLOGICAL SOCIETY OF EDINBURGH; HONORARY MEMBER OF THE GEOLOGICAL SOCIETY OF MANCHESTER, ETC., ETC., ETC.

AUTHOR OF "SYNOPSIS OF THE CARBONIFEROUS LIMESTONE FOSSILS OF IRELAND;" "SYNOPSIS OF THE SILURIAN FOSSILS OF IRELAND;" "CONTRIBUTIONS TO BRITISH PALÆONTOLOGY;" ONE OF THE AUTHORS OF SEDGWICK AND McCOY'S "BRITISH PALÆOZOIC ROCKS AND FOSSILS;" "PRODROMUS OF THE PALÆONTOLOGY OF VICTORIA," ETC.

PROFESSOR OF NATURAL SCIENCE IN THE MELBOURNE UNIVERSITY.

GOVERNMENT PALÆONTOLOGIST, AND DIRECTOR OF THE NATIONAL MUSEUM OF MELBOURNE, ETC.

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M DCCC LXXXVI.

ADVERTISEMENT.

It having been considered desirable to ascertain accurately the natural productions of the Colony of Victoria, and to publish works descriptive of them, on the plan of those issued by the Governments of the different States of America, investigations were undertaken, by order of the Victorian Government, to determine the Geology, Botany, and Zoology of the Colony, to form collections illustrative of each for the public use, and to make the necessary preparations for such systematic publications on the subject as might be useful and interesting to the general public, and contribute to the advancement of science.

As the geological and botanical investigations have already approached completion, and their publication is far advanced, it has been decided now to commence the publication of the third branch completing the subject, namely, that of the Zoology or indigenous members of the different classes of the animal kingdom.

The Fauna not being so well known as the Flora, it was a necessary preliminary to the publication to have a large number of drawings made, as opportunity arose, from the living or fresh examples of many species of reptiles, fish, and the lower animals, which lose their natural appearance shortly after death, and the true characters of many of which were consequently as yet unknown, as they had only been described from preserved specimens. A Prodromus, or preliminary issue, in the form of Decades, or numbers of ten plates, each with its complete descriptive letterpress, will be published, of such illustrations as are ready, without systematic order or waiting for the completion of any one branch. The many good observers in the country will thus have the means of accurately identifying various natural objects, their observations on which, if recorded and sent to the National Museum, where the originals of all the figures and descriptions are preserved, will be duly acknowledged, and will materially help in the preparation of the final systematic volume to be published for each class when it approaches completion.

Natural History of Victoria.

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M DCCC LXXXVI.

PREFACE.

—o—

This twelfth Decade gives illustrations in the first plate of two varieties and the young of the commonest of the Lizards found near Melbourne, the *Grammatophora muricata*, absurdly called "Blood-sucker" by the colonists.

The second plate gives the detailed illustrations of the parts of the Antarctic representative of those curious fish, so interesting to geologists, the *Chimæræ;* this species, the *Callorhynchus Antarcticus* being often called Elephant Fish by the fishermen.

The third plate is devoted to details of both sexes of that famous and most peculiar Shark, the Port Jackson Shark or Cestracion, the *Heterodontus Phillipi*, the teeth of which resemble many ancient fossil forms found in the Palæozoic Rocks of Europe, which would be inexplicable but for the existence in our day of this Australian type, in the opinion of many authorities, who see a nearer affinity than I do.

The Fish figured on the fourth plate, the *Trachichthys Australis*, is so rare that the type specimen in the British Museum, imperfectly described eighty years ago, has remained unique until Count Castelnau and myself each recently obtained an example, enabling me now to give a careful figure from the fresh specimen.

Plate 115 illustrates a newly discovered kind of Sea-Pike, the *Lanioperca mordax*, of a genus peculiar to this part of Australia.

The three next plates continue the series of Polyzoa, the specimens and descriptions of which have been contributed by my friend Dr. MacGillivray to the National Museum and this work.

Plate 119 figures for the first time, with details of both sexes, an abundant Gum-tree Grasshopper, of the family *Gryllidæ*, contrasting, by the shortness of the ovipositor, with that of the family *Locustidæ*, figured on Plate 109.

The last plate gives figures of both sexes of a very rare form allied to the preceding, but of a different sub-genus.

The succeeding Decades will illustrate as many different genera as possible, and will deal first, usually, with species of some special interest, and of which good figures do not exist or are not easily accessible.

Frederick McCoy.

21st July, 1886.

Dr Wild del. et lith.

Prof. McCoy dirext.

Steam. lithe Govt. Printing Office

PLATE 111.

GRAMMATOPHORA MURICATA (SHAW SP.).

THE BLOOD-SUCKER.

[Genus GRAMMATOPHORA* (KAUP). (Sub-kingd. Vertebrata. Class Reptilia. Order Sauria. Sub-order Pachyglossæ. Tribe Strobilosaura. Family Agamidæ.)

Gen. Char.—Body moderate, subtrigonal or slightly depressed in section. Head large, trigonal, obtusely pointed in front, depressed; sides flattened, and separated from the top by an angle, covered with small, irregular, unequal, keeled, scale-like plates. Nostrils lateral, under the lateral angle, a little behind tip of snout. Ear-drum large, rounded. Tongue short, flat, narrow, spongy, notched at tip. Teeth:—molars, short, semioval, compressed, on edge of jaw bone, 5 incisors in middle, and 2 canines on each side above, 4 incisors below. Throat not pouched; with a strong transverse fold between its base and front of thorax. Scales of back imbricated, unequal. Femoral and preanal pores large, numerous. Tail long, conical, tapering, depressed at base, with keeled, imbricated scales. Toes slender, the 4 first gradually increasing in length, the 5th a little shorter than the 2nd; subdigital scales transversely keeled very strongly. Australia.]

DESCRIPTION.—Body moderate; head small, nearly an isosceles triangle; a strong keel from tip of snout over orbit to hind margin of eye; nostril half way between tip of snout and the anterior angle of eye; occipital plate scarcely larger than those surrounding it on head and nape; tail more than twice as long as head and body, slender. One row of small, contiguous, triangular, keeled spines along midline of back, largest near origin at occiput, smallest at termination over base of tail; on each side, at a distance of two ordinary scales, a row of large similar scales, mostly separated by the length of one or two of the small, ordinary body scales, these two lateral rows converging, running close together, where midline ends at base of tail, continued as two approximate, conspicuous, small keels for first fourth of tail, beyond which they are undistinguishable from the rest of the strongly keeled scales of the tail; a similar outer row of keeled spines extends from half way between midline and shoulder, ending at first fourth of base of tail; between the 2 lateral rows and outside the outer one are several, irregularly scattered, similar, but slightly smaller, triangular, keeled, spinose scales, very rarely forming a slightly marked, outer, lateral, additional line; ordinary scales of back rhombic, keeled, the keels stronger and forming continuous longitudinal ridges on tail; scales of belly and throat similar, but more faintly keeled; a row of keeled spines, like those of back, extends from eyebrow behind eye, over the ear; a similar, short, ridge-like row under the ear; and one from each side of occiput extending obliquely backwards and downwards to outer lateral row of body; a few spinose scales on upper side of thigh and front of leg; scales on front of arm and top of head imbricated, strongly keeled. Preanal pores 3 or 4 on each side; femoral pores 3 or 4 on each side, not reaching half the length of the thigh. *Color:* Varying from pale brownish ash to dark olive brown above, the space between the inner lateral rows traversed by the keeled serrated midline, usually mottled irregularly with darker; sides irregularly mottled with dark brown on lighter greyish-brown ground; 2 rows of 6 or 7 large, conspicuous, brownish-black, triangular spots run along the back, the base of each

* I continue the use of Kaup's generic name for these Lizards, instead of *Amphibolurus* of Wagler adopted by Boulenger in his recent important work, because where so many cases of applying one name to two or more genera exist, I do not think Stephens having used this one first for a genus of small moths is likely to produce any serious confusion.

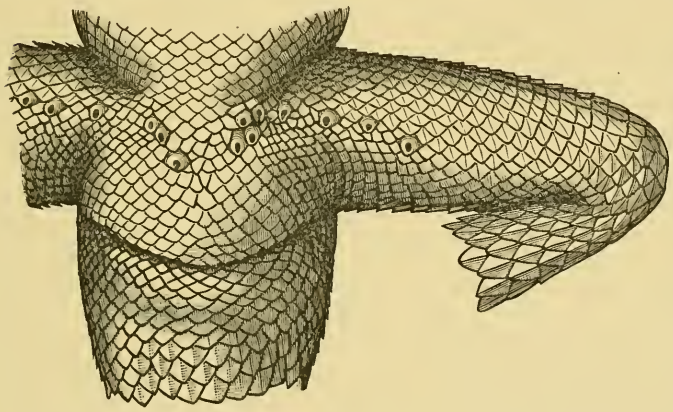
coinciding with the median lateral keels, the apices directed outwards; the broad, longitudinal space between the inner and outer row of spinose keels much lighter in color than the rest of the back, and either divided into a row of large, lateral, oval spots on each side, by the apices of the black triangular marks extending to meet a similar smaller row of blackish triangular spots, having their bases on the outer lateral row of spines and their apices inwards; or forming a more or less continuous longitudinal pale band on each side where the triangles are disconnected; the 2 inner rows come together to form lozenges or rhombs over basal fourth of tail where these two ridges approach; hinder three-fourths of tail, legs, and thighs with rather distant, transverse, dark bands, those of tail usually 6 or 8 scales wide, with lighter intervals 2 or 3 scales wide, but sometimes narrower than the light bands; top of head with 5 or 6 narrow, transverse, chevron-like, dark brown bands starting from an irregular midline; a broad dark band extends from the eye, enclosing the ear; a black angular spot half way between shoulder and ear; under side of throat and belly either plain pale ashy-grey or (sometimes) dark grey, or (more usually) mottled irregularly with darker grey. From 3 to 4 femoral pores irregularly spaced on basal half of each thigh, and 3 to 4 on each side preanal ones. Iris dark brown; inside of mouth and tongue yellow. 2 canines and 11 molars on each side above. About 12 labial plates on each side; rostral hexagonal, 3 times wider than high; chin plate large, pentagonal, with nearly equal sides. Moderate specimen, 1 ft. 1 in. total length; tip of snout to occiput 1 in., to ear 1 in. $\frac{1}{2}$ line; width of head, 11 lines; tip of snout to shoulder 1 in. 7 lines, to thigh 3 ins. 7 lines, to vent 4 ins.; length of tail, 9 ins.; width of body, 1 in. 3 lines; width of tail at base 6 lines, at half its length, 3 lines; length of arm 9 lines, of forearm 7 lines; longest toe and claw, 6 lines; length of thigh, 1 in.; leg, 1 in.; longest toe and claw from base of hind toe, 1 in. 1 line. Toes slender, third anterior one nearly as long as the fourth; third posterior one only two-thirds as long as the fourth.

Reference.—=Muricated Lizard, White Jour. Voy., t. 31, fig. 6; = *Lacerta muricata*, Shaw Gen. Zool., v. 3, pt. 1, t. 65, f. 2; = *Grammatophora*, id. Kaup Isis, 1827, p. 621; =*Agama Jacksoniensis*, Guer. Icon. Reg. An., t. 3, f. 1.

With the exception of the variations in color above noted, this pretty little Lizard varies very little. The absence of bearded scales on throat and across the occiput, and the invariably present, small, median row of keeled scales along back, distinguish it readily from the young of *G. barbata*. The resemblance is much closer to the *G. angulifera* (of which I have many specimens before me from Western Australia), which is, when adult, of nearly the same size (though more slender) and much alike in coloring. But this latter species, which I have not seen in Victoria, is easily distinguished by its comparatively very short tail, little exceeding the body in length, while it is more than double the length in *G. muricata*. The average proportion of tail to the total length in *G. muricata* is $\frac{7 5}{1 0 0}$, while in *G. angulifera* it is only $\frac{5 3}{1 0 0}$; the base of the tail in *G. angulifera* is also much wider, and has a conspicuous lateral line of 6 or 7 large spinous tubercles on each side, not

found in *G. muricata*. The tail, it should be mentioned, is shorter in the young than in the adult of this species. The head of *G. muricata* is more slender than in *G. angulifera*, in which latter the femoral pores are more numerous and closer, making a nearly continuous line across the lower part of body. The femoral pores of the present species are, as in the woodcut, sometimes 3 on one thigh and 4 on the other, and the preanal pores are sometimes 3 on one side and 4 on the other in the same individual. In some specimens of *G. angulifera* there is a slight indication of a median dorsal keel, but it is usually absent; it is present always in the long-tailed *G. muricata*.

To show the irregularity of the preanal and of the femoral pores, I give here a woodcut of a specimen, magnified two diameters, from the Goulburn District, in the Museum, showing 3 femoral pores on one thigh and 4 on the other, and 3 preanal pores on one side and 4 on the other.



This is the commonest Lizard about Melbourne, especially in the sandy districts on the south coast, where it may often be seen, as represented in our plate, on a stump of Tee-tree, which it resembles in colors and marking so nearly that it is almost impossible to distinguish it, unless the sun happens to glance from its bright eyes. When seen it will remain so immovable as almost to induce a belief that it is a withered stump; but if your eye should leave it for an instant, it is gone like a flash. It is fond also of basking in the sun on sandy paths, &c. The eggs are laid in the sand.

Why the popular name of "Blood-sucker" should be so universally given to this harmless creature by the colonists (except on

the *lucus a non lucendo* principle) I cannot conceive. In confinement it feeds readily on flies, and makes an elegant little pet in a Wardian Fern-case.

Explanation of Figures.

Plate 111.—Fig. 1, adult specimen, natural size, of the variety with lateral bands broken into rows of oval spots, in its customary attitude on a stump of Tee-tree. Fig. 1*a*, head and part of the neck, viewed from above, magnified two diameters, to show the character of scales. Fig. 1*b*, hind foot, magnified two diameters, to show character of scales on under-side. Fig. 1*c*, anterior foot, magnified two diameters, to show the transverse keeling of the scales on under-side. Fig. 1*d*, scales of back, magnified two diameters. showing the middle and two lateral rows of keeled scales. Fig. 1*e*, young, natural size, showing the shorter tail as compared with the adult. Fig. 1*f*, variety with darkly mottled under-side, and partially continuous light bands on side of back instead of the oval light marks of usual variety, natural size.

Frederick McCoy.

(Fishes.)

A. Bartholomew del. et lith. Prof. M.Coy direct. Steam. litho. Govt. Printing Office

PLATE 112.

CALLORHYNCHUS ANTARCTICUS (LACÉP. SP.).

THE SOUTHERN CHIMÆRA.

[Genus CALLORHYNCHUS (GRONOVIUS). (Sub-kingd. Vertebrata. Class Pisces. Sub-class Elasmobranchia. Order Holocephala. Family Chimæridæ.)

Gen. Char. — Body semifusiform, tapering from the head, laterally compressed; tail elevated, heterocercal, caudal fin on underside only; head with the snout produced into a long proboscis, of median and two lateral cartilages, terminating in a wide, thin, ovate, skinny flap; anterior dorsal fin with a long, compressed, serrated, bony spine on its anterior edge; second dorsal with a longer base; anal fin small, deep, triangular, close to the caudal; pectoral very large, triangular; skin smooth, except two rows of minute spines usually felt between the dorsals; pupil elliptical, vertical. *Dentary plates:* Anterior of upper jaw thick, narrow, pointed in front; grinding surface in both jaws large; male with a small frontal appendage between the eyes, with bifurcate base, lodged in a cavity, both cavity and tip of appendage set with numerous small, recurved spines.]

DESCRIPTION.—Pectoral reaching a little beyond the base of the ventral fins; first dorsal commencing slightly behind the gill-opening, and origin of pectoral; second dorsal commencing over front edge of ventrals; dorsal spine nearly twice the length of the space from its base to corner of orbit, bare in its whole length, compressed, gently curved backwards, posterior edges finely serrated on apical third of length; skinny flap at end of snout ovate, broad end down, with rounded margins, twice as long as wide. Lateral line slightly undulating from extremity of tail, running along its lower margin, taking an abrupt turn upwards a little behind front edge of caudal to a little behind the eye where it branches, one branch going over the eye forwards nearly to tip of snout, giving off a branch behind the eye crossing top of head to join that of other side at an acute angle directed backwards; lower branch going forward under the eye and sending one branch along side of proboscis, one to anterior part of mouth, and one to angle of mouth, and one backwards to a little in front of gill-opening extended by a few pores, as if to join that from the other side, but interrupted in the middle under the throat. *Color:* Body bluish-grey lead color with silvery lustre; under surface whitish; a black upper margin to orbits; a black trigonal spot in front of dorsal fin, with base behind, and apex reaching between eyes; a black band on each side of base of first dorsal uniting into a broad mesial band along middle of back to sides of second dorsal, and thence along midline to end of tail, receiving a small lateral branch from under hind half of second dorsal; dorsal, anal, and caudal fins brownish, with blackish tips and margins; ventrals brownish with blackish base; pectorals brownish below, blackish towards margins, black above, brownish at base. Iris green; front of snout-flap flesh color.

MEASUREMENTS.	Ft.	ins.	lines.
Length from tip of proboscis to end of caudal fin	2	7	0
„ „ „ base of proboscis	0	2	3
„ „ „ anterior edge of orbit ...	0	4	7
„ „ „ anterior base of 1st dorsal ...	0	8	2
„ „ „ „ „ 2nd dorsal ...	1	4	2
„ „ „ „ „ pectoral ...	0	7	3
„ „ „ „ „ ventral ...	1	2	2
„ „ „ „ „ anal ...	1	9	3
„ „ „ „ „ caudal ...	1	10	10
„ of spine	0	5	4
„ of base of 1st dorsal	0	2	9
Height of 2nd dorsal	0	3	0

Measurements—*continued.*	Ft.	ins.	lines.
Length of base of 2nd dorsal	0	5	6
„ of pectoral	0	8	0
Greatest width of pectoral	0	3	6
Depth of ventral	0	3	6
Greatest width of ventral	0	2	11
Depth of anal	0	3	0
Greatest width of anal	0	1	3
Greatest depth of caudal (anterior lobe)	0	2	2
Space between 1st and 2nd dorsal	0	5	6
„ „ 2nd dorsal and caudal	0	2	3
„ „ pectoral to ventral	0	6	6
„ „ ventral to anal	0	6	3
„ „ anal to caudal	0	0	4
Diameter of orbit	0	0	11
Length of snout	0	2	3
„ of ovate flap	0	1	11
Greatest width of flap	0	0	11
Depth of body	0	4	6

Reference.—= *Callorhynchus* (Gronov.), Mus. Ichth., v. 1, p. 59, t. 4 = *Chimæra callorhynchus*, Lin. Syst. Nat. = *Chimæra Antarctica*, Lacép. Hist. Poiss., v. 1, p. 400, t. 12, f. 2 = *C. Australis*, Shaw Gen. Zool., v. 5, p. 368 = *C. Tasmanius*, Rich. Trans. Zool. Soc., v. 3, p. 696.

The two rows of spines on the back between the dorsals may be distinctly felt in most of the large female specimens, but they are not perceptible in a male specimen of smaller size before me. The pectorals seem slightly smaller in the males, and do not extend quite so far towards the ventrals. The curious grasping organ on the forehead of the male arises by a widely bifurcate base between the eyes a little behind the anterior edge of the orbit ; its middle portion is oblong, about three-fourths the diameter of the orbit in length, about half as wide as long, narrowed and rounded towards the front, where it is very convex below and set with recurved spines; the hollow into which it can be depressed is set with recurved spines at its anterior end.

This fish is tolerably common along the coast, and is frequently called Elephant Fish by the fishermen.

Explanation of Figures.

Plate 112.—Fig. 1, side view of female specimen, one-fourth of the natural size. Fig. 1*a*, the same, viewed from above, to show the shape of the black markings and course of the porous lines on top of head. Fig. 1*b*, front view of head, natural size, to show the position of the nostrils and grinding plates of mouth, the added outline showing position of the flap of the snout. Fig. 1*c*, side view of dentary plates of upper and lower jaws, natural size. Fig. 1*d*, dentary plates of upper jaw, grinding surface, natural size. Fig. 1*e*, inner view of grinding surface of dentary plates of lower jaw, natural size. Fig. 1*f*, side view of flap at end of snout, natural size. Fig. 1*g*, front view of ovate snout-flap, natural size. Fig. 1*h*, side view of frontal grasping process of male, half the natural size, shewing the tooth-like spines at its distal end, raised up from the spinose cavity, into which it fits. Fig. 1*i*, side view of dorsal spine, natural size. Fig. 1*k*, section of dorsal spine.

Frederick McCoy.

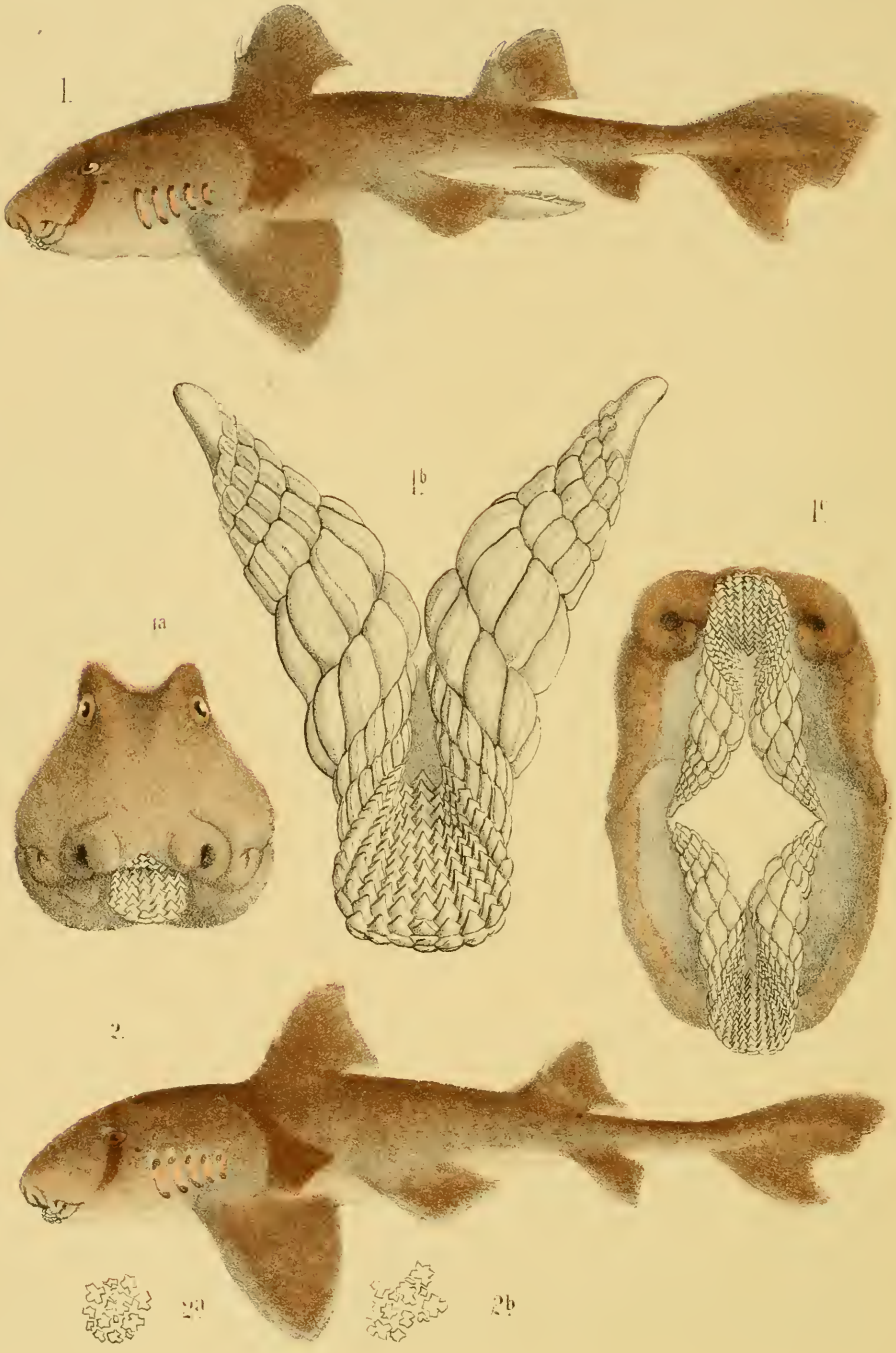

1.
1b
1c
1a
2.
2a
2b

PLATE 113.

HETERODONTUS PHILLIPI (LACÉP. SP.).

PORT JACKSON SHARK, OR BULL-DOG SHARK.

[Genus HETERODONTUS (BLAINV.) = CESTRACION (CUV., not KLEIN.) (Sub-kingdom Vertebrata. Class Pisces. Order Chondropterygii. Sub-order Plagiostomata. Tribe Selachoidei. Family Heterodontidæ.)

Gen. Char.—Ovate, fusiform; head large, blunt, rounded in front, high, cuboid, with a prominent longitudinal ridge over each eye; mouth narrow, nearly terminal; upper lip divided into 7 lobes (1 median and 3 on each side); lower lip with one long fold on each side; nostrils confluent with mouth cavity; spiracles very small, below and behind the eye. Gill-openings small. Teeth alike in both jaws, the median front rows very small, acutely tricuspid when young, simple and with obtusely triangular cusp in middle age, blunt and hexagonal when old; more posterior teeth large, oblong, longer than broad, flattened, arranged in oblique, spiral rows on each side of jaw, the anterior and posterior ones smaller than those in middle. *Fins:* Two dorsals, each with a small, smooth spine on front edge, anterior dorsal between pectorals and ventrals, posterior dorsal in front of anal. Shagreen spines, or granules, of skin irregularly stellate on upper surface. East and West Pacific and Indian Oceans.]

DESCRIPTION.—Form semifusiform, tapering rapidly from the head to the tail. Head large, about as high as broad, bluntly rounded in front, muzzle short; two prominent, bluntly rounded ridges arise, one on each side, beginning about over the first gill-slit, arching over the eye and descending with the slope of the profile (which is nearly straight at an angle of about 40° from longitudinal midline) to about over angle of mouth, bounding a deep concavity along top of head; their distance apart about equal to distance from anterior edge of orbit to upper end of first gill-opening; height of head at orbit about one-seventh of total length, including caudal fin; length of head from tip of snout to first gill-opening about one-sixth the length of body; mouth and nostrils nearly terminal on under-side; upper lip as wide as head, divided into three lateral lobes, the outer one large, longitudinally oblong, flat, overlapping under lip, next a nearly circular spirally involute lobe going nearly round the large nostril, and next a broad rounded lobe; the middle occupied by a thin semicircular edge exposing the anterior median rows of teeth, which are prominent; lower lip with a long fold on each side from angle to the middle, exposing the median rows of teeth in front. Spiracle minute, about the vertical diameter of the orbit below hind margin of eye. Orbit twice as long as wide, close under the ridges on the upper margin of the sides of the head; pupil longitudinally horizontal, elliptical. *Teeth:* Upper and lower jaws alike, but a few more rows in upper than lower jaw; quadrate, oblong in front, the rami widening so as nearly to touch about the middle of their length, leaving an ovate median space, beyond which they narrow and divaricate to the back; teeth in about 27 rows, about 12 rows of about 13 teeth each, longitudinal, and slightly diverging in front, each tooth of which is very small, triangular, transversely ovate, front ones blunt, forming acutely angular simple erect cusps farther back, and most acute, and with 1 or 2 lateral cusps in young teeth behind; 7 or 8 rows spirally arranged obliquely on each ramus from within, forwards and outwards, of large, flattened, slightly convex teeth, obliquely rhomboidal, each with a narrow longitudinal ridge nearer the outer margin, and having the surface sculptured with transverse vermicular ridges and small pits; teeth of the fifth row from the back largest, all longer than wide. *Fins:* Pectorals very large, about one-fifth the length of the fish, width about two-thirds the length; posterior edge nearly

straight, posterior angle rounded; front edge of first dorsal slightly in front of, and vertically over the posterior base of pectorals, trapezoidal, front margin rounded, about as long as from its base to acute posterior angle; hind edge obliquely truncated, concave; second dorsal about one-third smaller than the first, of the same shape, origin behind the base of the ventrals, and terminating in front of anal, nearer to anal; anal more than the length of its inner margin in front of caudal, similar in form to second dorsal, but smaller; caudal obliquely truncated, with its lower part divided into two lobes by a deep quadrate notch, upper lobe separated from the lower by the end of the body; ventrals trapezoidal, nearly equidistant between the first and second dorsals. Spines in front of dorsal fins strong, basal two-thirds covered with skin, exposed point smooth, compressed, triangular in section, reaching about half the height of the fin, growing thicker with age. Skin with the shagreen points irregularly cruciform on back and sides, globular on throat and on lower tip of pectorals. *Color:* Reddish-brown above, pinkish-yellow below; a dark brown band crosses top of head and eyes passing down cheeks towards corner of mouth; a broad brown band runs along middle of back from occiput to first dorsal, then dividing obliquely outwards and backwards to upper surface of ventral fins, and giving off a branch to the pectorals, inclosing a light, triangular space over posterior base of pectorals; another dark medial band extends along back from anterior dorsal on each side of second dorsal to tail; pectorals and ventrals blackish-brown above, pinkish on edge below; dorsal and anal fins lighter; iris greenish-brown. (The brown dark bands are most distinct on the young, nearly or quite obsolete on the old, and invisible on stuffed or spirit specimens.) The caudal fin is relatively larger in young than in old individuals.

MEASUREMENTS.

	Large Female.			Small Male.		
	Ft.	ins.	lines.	Ft.	ins.	lines.
Total length	3	8	0	2	9	0
Length from tip of snout to corner of mouth	0	3	4	0	2	0
Width of mouth	0	4	0	0	2	1
Tip of snout to anterior edge of orbit	0	4	8	0	3	3
„ „ posterior edge of orbit	0	5	9	0	4	1
„ „ first gill-opening	0	7	5	0	5	5
„ „ anterior base of pectoral	0	10	3	0	7	0
„ „ anterior base of first dorsal	1	1	6	0	9	3
„ „ posterior „ „	1	4	6	0	11	9
„ „ anterior base of ventral	1	10	0	1	2	8
„ „ „ „ second dorsal	2	2	6	1	7	3
„ „ posterior „ „	2	5	0	1	9	3
„ „ anterior base of anal	2	6	6	1	10	7
„ „ posterior „	2	8	0	1	11	6
„ „ anterior edge of lower lobe of caudal	3	0	6	2	2	7
Distance of spiracle from middle of posterior edge of orbit	0	1	0	0	0	7
Width of head at vertical of eye	0	7	0	0	4	5
Height at same to superciliary ridges	0	6	7	0	3	10
Space between superciliary ridges	0	3	4	0	2	5
Length of anterior edge of pectoral	0	8	2	0	6	3
Outer edge of ditto	0	7	7	0	5	5
Exposed portion of spine of anterior dorsal	0	0	10	0	0	8
Antero-posterior diameter of same	0	0	4	0	0	3
Transverse posterior diameter of same	0	0	$2\frac{1}{2}$	0	0	2
Anterior edge of first dorsal	0	4	3	0	3	7
Posterior „ „	0	3	3	0	2	8
Exposed portion of spine of second dorsal	0	0	10	0	0	8
Antero-posterior diameter „	0	0	4	0	0	$2\frac{1}{2}$
Transverse posterior diameter „	0	0	$2\frac{1}{2}$	0	0	$1\frac{1}{2}$
Anterior edge of second dorsal	0	3	9	0	2	11
Posterior edge of same	0	3	1	0	2	5

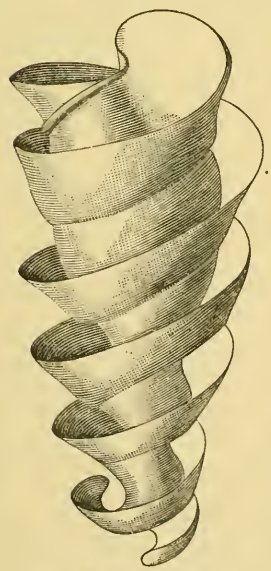
MEASUREMENTS—*continued.*

	Large Female.			Small Male.		
	Ft.	ins.	lines.	Ft.	ins.	lines.
Anterior edge of ventral	0	3	6	0	2	6
Posterior edge of same	0	3	7	0	2	3
Anterior edge of anal	0	3	6	0	2	7
Posterior edge of same	0	2	2	0	1	10
Anterior edge of lower lobe of caudal	0	5	0	0	3	7
Upper lobe above end of vertebral line	0	2	0	0	1	10
Number of stellated spines of skin in 3 lines on head	Seven			Seven		

REFERENCE.—=Port Jackson Shark, Phillip's Voy., p. 283 = *Squalus Phillipi*, Lacép. Poiss., v. 1, p. 218 = *Cestracion Phillipi*, Cuv. R. A. = *Heterodontus Phillipi*, Blainville, Nouv. Bul. Sc., 1816, p. 121.

In the admirable descriptive and illustrated memoir on the *Heterodonti*, by Baron Miklouho-Maclay and Mr. W. Macleay, in the Proceedings of the Linnæan Society of New South Wales (Vol. III., pt. 4), the interesting fact is announced of all the teeth, both front and lateral, being small, sharp-pointed, and with one or two lateral cusps, in the young a few inches long; showing a resemblance to those of *Notidanus*, the two anterior cusps being more perpendicular.

This Shark, so famous amongst zoologists and geologists under the name of *Cestracion*, or Port Jackson Shark, is called the Bull-dog Shark by Victorians, from the form of the head and muzzle. No other Shark has any approach to the extraordinary structure, shape, and arrangement of the teeth of this genus, which has been taken by Agassiz and Owen as illustrating in our time the European fossil genus *Cochliodus* of the Carboniferous Limestone formation; to which, in my opinion however, the relationship is not really close. It is common in Hobson's Bay. The stomach is filled with fragments of shells. There are only two eggs at a time, laid once a year. These eggs are very remarkable objects, not uncommon on the shore; they are conical in shape, about 6 inches long, and surrounded with two broad keels extending spirally and obliquely round the egg from one end to the other, like six turns



Egg; half the natural size.

of a broad screw; the substance is of a tough, dark brown, horny appearance. The stellated form of the shagreen is quite unlike that of any other genus of Sharks.

Explanation of Figures.

Plate 113.—Fig. 1, side view, male, reduced. Fig. 1*a*, anterior view of head, mouth closed, showing the form of the lobes of the lips in front, and exposure of teeth above and below. Fig. 1*b*, teeth of lower jaws, natural size. Fig. 1*c*, mouth widely opened, to show similarity of dentition above and below. Fig. 2, female, reduced. Figs. 2*a* and 2*b*, irregularly stellated shagreen of head and body, magnified.

Frederick McCoy.

(Fishes)

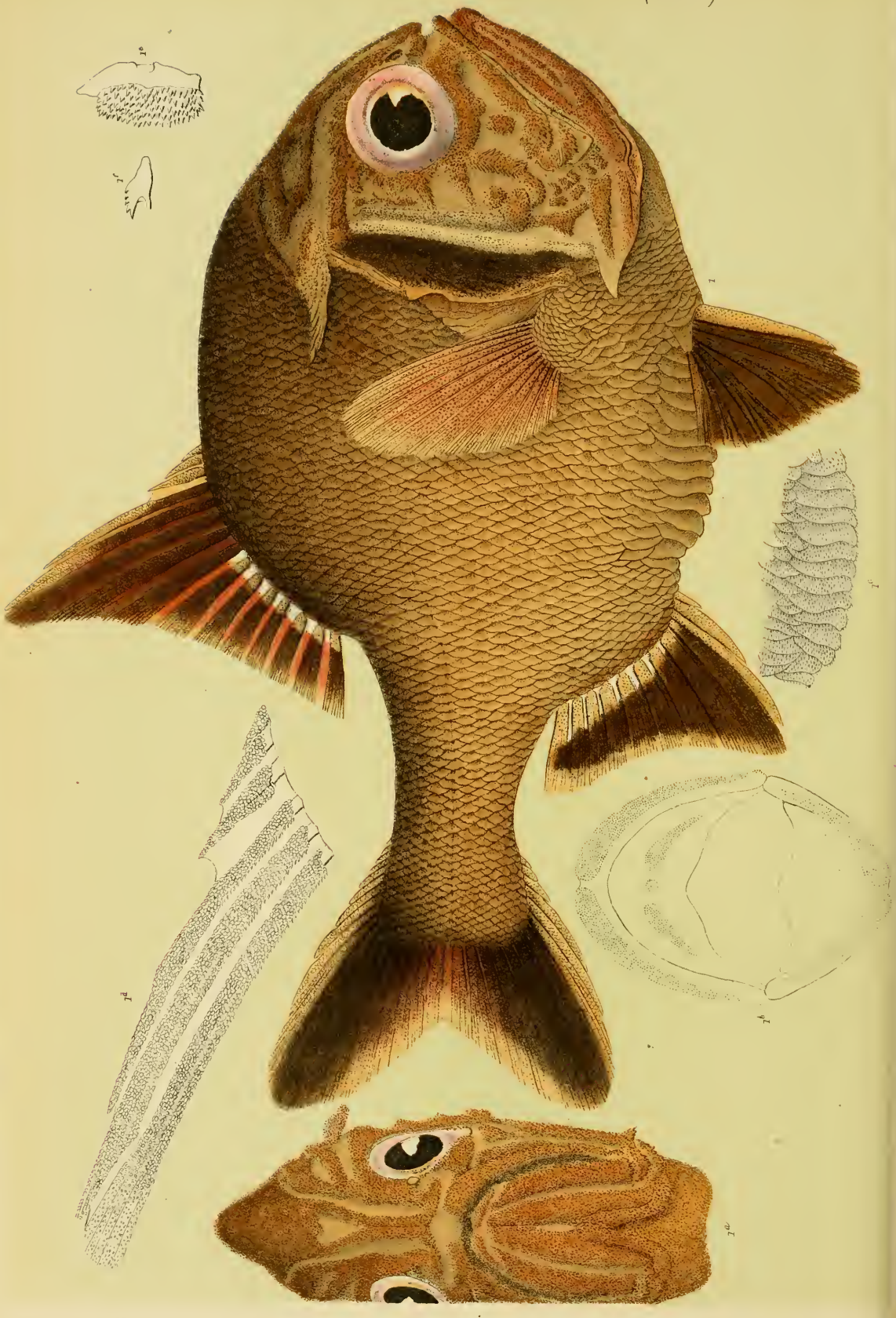


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PLATE 114.

TRACHICHTHYS AUSTRALIS (SHAW).

AUSTRALIAN ROUGH FISH.

[Genus TRACHICHTHYS (SHAW). (Sub-kingdom Vertebrata. Class Pisces. Sub-class Teleostei. Order Acanthopterygii. Family Berycidæ.)

Gen. Char.—Ovate, compressed; muzzle very short, semioval; cleft of mouth oblique; chin projecting a little in front of upper jaw; eye very large; teeth very fine, villiform on jaws, palatines, and vomer. Eight branchiostegal rays. A very long, strong spine extending backwards from supra-scapula; a small triangular one on upper margin of operculum, and a large one on basal angle of preoperculum; scales semielliptical, roughly granular, serrated at edge, and with upper and lower ends of anterior edge prolonged into flat, smooth, triangular spines on covered portion; scales of lateral line not larger than adjacent scales; a row of very large compressed scales forming a strongly serrated edge to abdomen. One dorsal; ventral with six rays; caudal forked. Australasia.]

DESCRIPTION.—Height of body about once and three-fourths in total length from chin to base of caudal; dorsal and ventral outlines from tip of snout to level of dorsal fin, forming two nearly similar curves, the dorsal higher. Head semi-elliptical; diameter of eye two and a half in length of head; mouth reaching under middle of eye, supra-maxillary reaching to vertical of hind edge of orbit; posterior nostril vertical, ovate, close to anterior edge of orbit; 2 lateral and 1 narrow, mesial, smooth, vertical bands on forehead, middle widening into a cordate space above; intermediate spaces and all the bones of the head and the 4 lower branchiostegal rays rough with close, irregularly arranged, spinose granules, without distinct radiated arrangement; supra-scapular spine very large, rough, with spinose granules passing to flexuous ridges at point; a broad, flat, very obtuse, triangular spine on upper margin of operculum, and a longer, stronger, and more acute, triangular, flattened spine at basal angle of preoperculum. *Teeth:* A broad band of very numerous, very minute, villiform teeth on upper and lower jaws, an ovate band of similar teeth on each palatine bone, and a round patch of the same on the vomer. *Scales:* 65 from operculum to base of caudal, and 24 from dorsal to ventral; rhomboidal, twice as high as long, those of lateral line not conspicuously larger than the adjacent ones; 12 very large between bases of ventral fins and anus, forming a strongly serrated keel to abdominal edge, the first anterior one obtuse, the others progressively more compressed and prominent; all the scales strongly pectinated on hind edge, and rough with spinulose granules. Lateral line indistinct, descending from under base of supra-scapular spine, with a slight curve to middle of tail. *Fins:* Dorsal, with 4 spines (the first little larger than a scale), and 11 broad branched rays, the first branched ray highest, the others rapidly shorter, the 6 latter nearly equal, and half the height of the triangular anterior portion; anal with 3 spines and 10 branched rays (2 last with one base), the 6 hind rays lower than the 3 anterior ones, first longest; caudal deeply bilobed, notch angular, lobes semioval, with 6 shorter rays above and 5 below, simple; 9 above and 7 below, thick, flat, branched; pectorals

quarter of an oval, of 13 rays; ventrals broad, trigonal, of 1 spine and 6 branched rays; all the fin-rays, spinous and branched, rough, with short, spinulose granules. *Color:* Whole surface of a rich tar-brown, with a vertical tawny-yellow band from supra-scapular spine to spine at base of preoperculum, the throat and pectoral lighter and with a rusty-red tinge, and the ventral blackish-brown with anterior spines yellowish; dorsal with spines yellowish, high triangular anterior portion blackish-brown, posterior lower portion reddish-chestnut brown, with a conspicuous yellowish-white, nearly colorless and translucent band at base, less than one-third the height of the fin, with a narrow lighter edge; middle lobe of caudal blackish-brown, upper, lower, and middle margins yellowish; anal blackish-brown, with a narrow, lighter edge and a light band, yellow and less translucent than that of the dorsal, at base, from one-fourth the height of the fin in front to one-half behind. Iris silvery behind, orange in front. Inside of mouth pale flesh color.

MEASUREMENTS.

	Ins.	lines.
Length from tip of snout to base of caudal	5	1
„ „ „ anterior edge of orbit	0	4
„ „ „ posterior „	1	1
„ „ „ edge of operculum spine	1	11
„ „ „ base of pectoral	2	1
„ „ „ „ ventral	2	8
„ „ „ „ dorsal	3	3
„ „ „ „ anal	4	3
„ of upper caudal lobe	1	6
„ „ lower „	1	4
„ „ pectoral	1	4
Greatest height of dorsal	1	6
„ „ 1st dorsal spine	0	2
„ „ 2nd „	0	3
„ „ 3rd „	0	4
„ „ 4th „	1	3
„ depth of body	3	7
„ thickness of body	1	6
Length of supra-scapular spine	0	10
Space between eyes	0	7
Number of scales in 6 lines at middle of body, longitudinally ...	Six	
„ „ „ „ vertically ...	Three	

REFERENCE.—Shaw, Nat. Mis. and Gen. Zool. Fishes, vol. iv., t. 92.

I should have had no doubt, like Count Castlenau, that this very rare fish was identical with the unique specimen described about eighty years ago by Shaw under the name of *T. Australis*, were it not for the statements of Dr. Günther that this type specimen of Dr. Shaw, which is still in the British Museum, has 3 dorsal spines, 2 anal spines, 8 ventral keeled scales, and the height of the body not quite one-half the length from snout to *base* of caudal. I cannot say I feel satisfied that these remarks are correct, for Shaw's figure, in his "General Zoology—Fishes," vol. iv., t. 92, shows exactly the same relative height as our specimen, while Dr. Günther's proportion would stand for the *edge*, not *base*, of the

caudal in the present fish and Shaw's figure. Furthermore, Dr. Gray, examining the same specimen (as quoted in Low's Fishes of Madeira, p. 65), says, "There are only 3, *or* 4 *at most*, spines in front of dorsal," and if the small anterior dorsal spine which I count in the present fish was possibly, according to such an accurate observer, present in Shaw's type, it may have been overlooked by Dr. Günther, as it is little bigger than a scale, and applied so closely to the base of the second as to be easily overlooked. I count 12 scales of the large abdominal serration, but the anterior one between the bases of ventral fins is so obtusely keeled, or little compressed, that it might not be counted by some observers; and Shaw's figure seems to me to indicate 11 of these. Count Castlenau, in the description of the single specimen known to him (Proc. Lin. Soc. N. S. Wales, vol. iii, p. 364), counts 4 spines to the dorsal, but only 2 spines to the anal, and 10 scales to the serrated ventral keel (Mr. Macleay, Des. Cat. Aust. Fish, p. 146, says 9 to 11). His statement that there are no teeth on the palate bones is to me at present inexplicable. Mr. Macleay, in his excellent work above quoted, proposes the new name *T. Jacksoniensis* for the New South Wales specimen described by Count Castlenau as *T. Australis*, on account of those differences from Shaw's specimen as described by Dr. Günther; but for the reasons indicated I think it better to retain the old name, pending further examination of the type specimen, which might more fully warrant the establishment of a distinct species.

The tongue is so closely connected to the subjacent parts as almost to warrant the statement of some writers that it is absent; its surface is smooth.

The only specimen I have ever seen is that figured, which was presented to the National Museum by Mr. Jenkins, the fishmonger, of Swanston-street, who has contributed many rarities to the collection. Described by Shaw originally from a New South Wales specimen collected by White nearly a century ago, no second specimen has been seen since until the present one and that described by Count Castlenau. Cuvier and Valenciennes, in their great "Histoire Naturelle des Poissons," have had to construct a description from Shaw's figure, no example existing in the

Continental museums. The only other species of the genus, the *T. elongata* (Günth.), is easily distinguished by its more elongate slender form, smooth spines, and other characters.

The specimen in our Museum was caught in Hobson's Bay, 23rd May, 1884. Not figured of natural colors before.

Explanation of Figures.

Plate 114.—Fig. 1, side view, natural size. Fig. 1*a*, front view of head, to show granulation and smooth spaces on top of head, natural size. Fig. 1*b*, interior of mouth, showing tongue, and bands of villiform teeth on jaws, palatine bones, and vomer, magnified two diameters. Fig. 1*c*, scales of abdominal keel, enlarged. Fig. 1*d*, anterior spines and branched rays of dorsal, to show their roughness, magnified two diameters. Fig. 1*e*, scale from lateral line, magnified three diameters. Fig. 1*f*, ditto, profile.

Frederick McCoy.

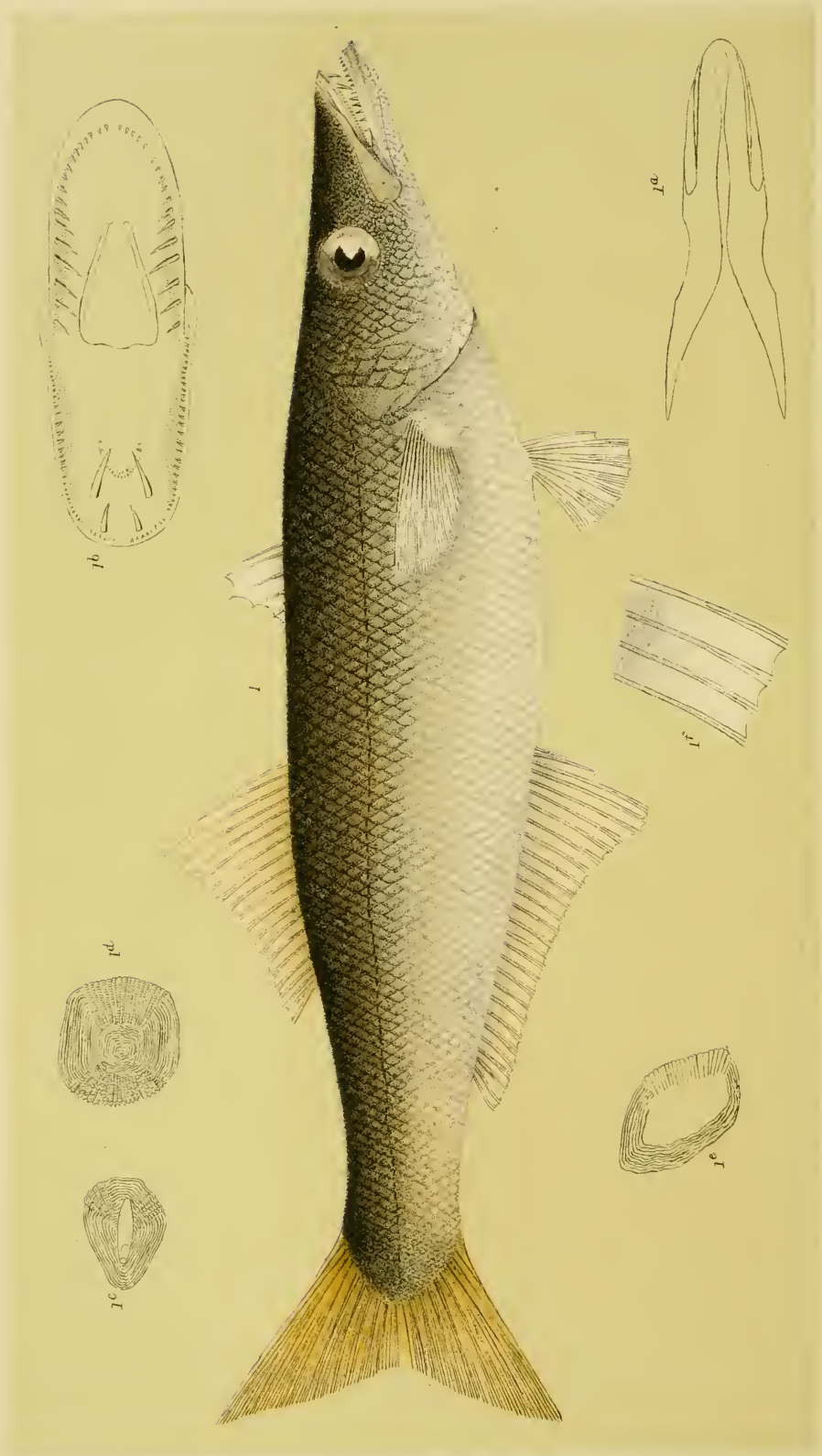

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PLATE 115.

LANIOPERCA MORDAX (GÜNTH.).

THE SKIP-JACK PIKE.

[Genus LANIOPERCA (GÜNTH.) = NEOSPHYRÆNA (CASTEL.) = DINOLESTES (KLUNZ.). (Sub-kingd. Vertebrata. Class Pisces. Sub-class Teleostei. Order Acanthopterygii. Family Sphyrænidæ).

Gen. Char.—Body compressed, elongate, covered with deciduous cycloid scales of moderate size. Head sharp-pointed, covered with small scales; cleft of mouth wide, lower jaw projecting in front of upper one. Teeth in villiform bands on vomer, palatines, and jaws; an outer series of stronger, and one or two pairs of very large, laniary, teeth in front of upper jaw. Tongue smooth; eyes lateral, moderate; seven branchiostegal rays; pseudobranchiæ. Fins: Two dorsal, anterior one short, of 5 spines; anal with 2 spines; ventrals nearly under pectorals. No denticulation on plates of head; margins of opercular pieces thin and membranous. Australia.]

D. 5 + 2, 18; A. 3, 26; V. 1, 5; P. 16; C. 18; L.L. $67\frac{6}{11}$.

DESCRIPTION.—Form semiovate; head pointed, with a slightly concave profile; abdominal outline much more convex than the dorsal line. Height of body about 5 times in total length (without caudal); length of head, about $3\frac{1}{4}$ in the same; eye nearer to end of operculum than to end of snout; diameter of eye equal to interorbital space, about $\frac{2}{11}$ of length of head; maxillary not quite reaching vertical from front margin of eye. Preoperculum with a wide obtuse sinus in posterior edge; lower angle forming a rounded finely-serrated lobe. Teeth of lower jaw much larger than upper jaw, 4 or 5 posterior ones large, distant, laniary; outer row of upper jaw nearly equal, small, and about their length apart. Pectoral fin ovate, less than half the length of the head, of 16 rays; ventrals deltoidal, united below, slightly behind base of pectorals; 1st dorsal of 5 slender spines, about $1\frac{1}{2}$ its length in front of 2nd dorsal, which is high in front and of 2 simple and 18 branched rays; anal shaped like 2nd dorsal, of 3 simple and 26 branched rays; caudal forked, lower lobe largest, of 18 long rays and 7 or 8 short ones on upper and lower edges. Scales large, very deciduous, lateral line very prominent, nearly straight from upper edge of operculum to middle of tail; 67 along lateral line, 6 above and 11 below it. *Color:* Top of head, back, and sides dark purplish-grey, fading into whitish on throat and belly; first dorsal, pectoral, and ventrals nearly colorless; 2nd dorsal pale yellowish-olive; anal lighter; caudal yellowish-olive; 2nd dorsal and anal fins with rows of minute dark dots crossing the rays. Iris silvery white. *Measurements:* Total length of average specimen from tip of snout to tip of caudal fin, 1 ft. 7 ins. 6 lines. Proportional measurements (taking total length as 100): From tip of snout to middle of caudal, $\frac{96}{100}$; to base of caudal, $\frac{86}{100}$; to front edge of 1st dorsal, $\frac{35}{100}$; to front edge of 2nd dorsal, $\frac{49}{100}$; to front edge of anal, $\frac{52}{100}$; to base of pectoral, $\frac{26}{100}$; to front edge of ventrals, $\frac{29}{100}$; to front edge of orbit, $\frac{11}{100}$; to hind edge of orbit, $\frac{16}{100}$; to tip of operculum, $\frac{26}{100}$; length of pectoral, $\frac{12}{100}$; length of ventral, $\frac{8}{100}$; width of ventrals, $\frac{7}{100}$; length of anal, $\frac{23}{100}$; greatest depth at 2nd branched ray, $\frac{8}{100}$; length of 1st ray, $\frac{5}{100}$; length of last ray, $\frac{2}{100}$; length of 1st dorsal, $\frac{5}{100}$; greatest height at 2nd spine, $\frac{3\frac{1}{2}}{100}$; length of 2nd dorsal, $\frac{6\frac{1}{2}}{100}$; greatest height at 4th branched

ray, $\frac{10}{100}$; length of last ray, $\frac{3\frac{1}{2}}{100}$; greatest depth between 1st and 2nd dorsal fins, $\frac{17}{100}$. Length of largest, anterior, upper tooth, 5 lines; length of upper anterior teeth, 2 lines; length of posterior lower teeth, 2 lines; length of teeth of anterior portion of lower jaw, $\frac{3}{4}$ line; those of edge of upper jaw, $\frac{1}{2}$ line. About middle of body 5 scales in one inch longitudinally, 3 vertically.

Reference.—*Lanioperca mordax* (Günth.), Ann. and Mag. Nat. Hist. 1872, v. 10, p. 183 = *Dinolestes Mülleri* (Klunz.), Archiv. für Naturges, 1872, p. 29, t. 3 = *Neosphyræna multiradiata* (Cast.), Proc. Zool. Soc. Vic., v. 1, p. 96.

The *Laniopercæ* resemble the *Sphyrænæ* or Sea Pikes, but have much more numerous rays in the second dorsal and anal fins, and have teeth on the vomer, and bands of villiform teeth inside the large ones on jaws. The typical species was made the type of the genus *Dinolestes* by Klunzinger, and of *Neosphyræna* by Count Castlenau.

The Skip-jack Pike, as it is called by the fishermen, is not uncommon in the winter and spring months, and is easily distinguished from the Sea Pike, which it resembles generally and in color, by its shorter, thicker form and much longer anal and second dorsal fins. The color often seems a purplish-brown in the fish shops, when dead some time and most of the scales off; but when fresh is purplish slate-grey above, like the Pike.

Klunzinger's figure gives only four rays to the first dorsal fin, and the photograph published by the Rev. J. E. Tennison-Woods, in the "Fish and Fisheries of New South Wales," omits the first dorsal fin altogether, the error in both cases probably arising from the ease with which the spines are completely concealed when depressed into a deep slit or groove at the base of the fin.

Explanation of Figures.

Plate 115.—Fig. 1, average specimen, half the natural size. Fig. 1*a*, under-view of head, to show the form of the isthmus, half natural size. Fig. 1*b*, inner view of mouth, natural size, showing the villiform bands of minute teeth, tapering at anterior and posterior ends on each jaw and on the front of the vomer, with the smooth tongue, and the row of larger outer teeth, becoming very large behind on the lower jaws, and the smaller, more uniform, outer row of teeth on the upper jaw, as well as the two pairs of great laniary teeth between the vomer and front of the mouth, and the few larger teeth on sides of back of vomer (the lower jaw is nearer the top of the plate). Fig. 1*c*, scales from lateral line, twice the natural size. Fig. 1*d*, scale from above the lateral line, twice the natural size. Fig. 1*e*, scale from below the lateral line, twice the natural size. Fig. 1*f*, portion of anal fin, natural size, to show the transverse streaks of minute dark dots.

Frederick McCoy.

№ 116
Венера
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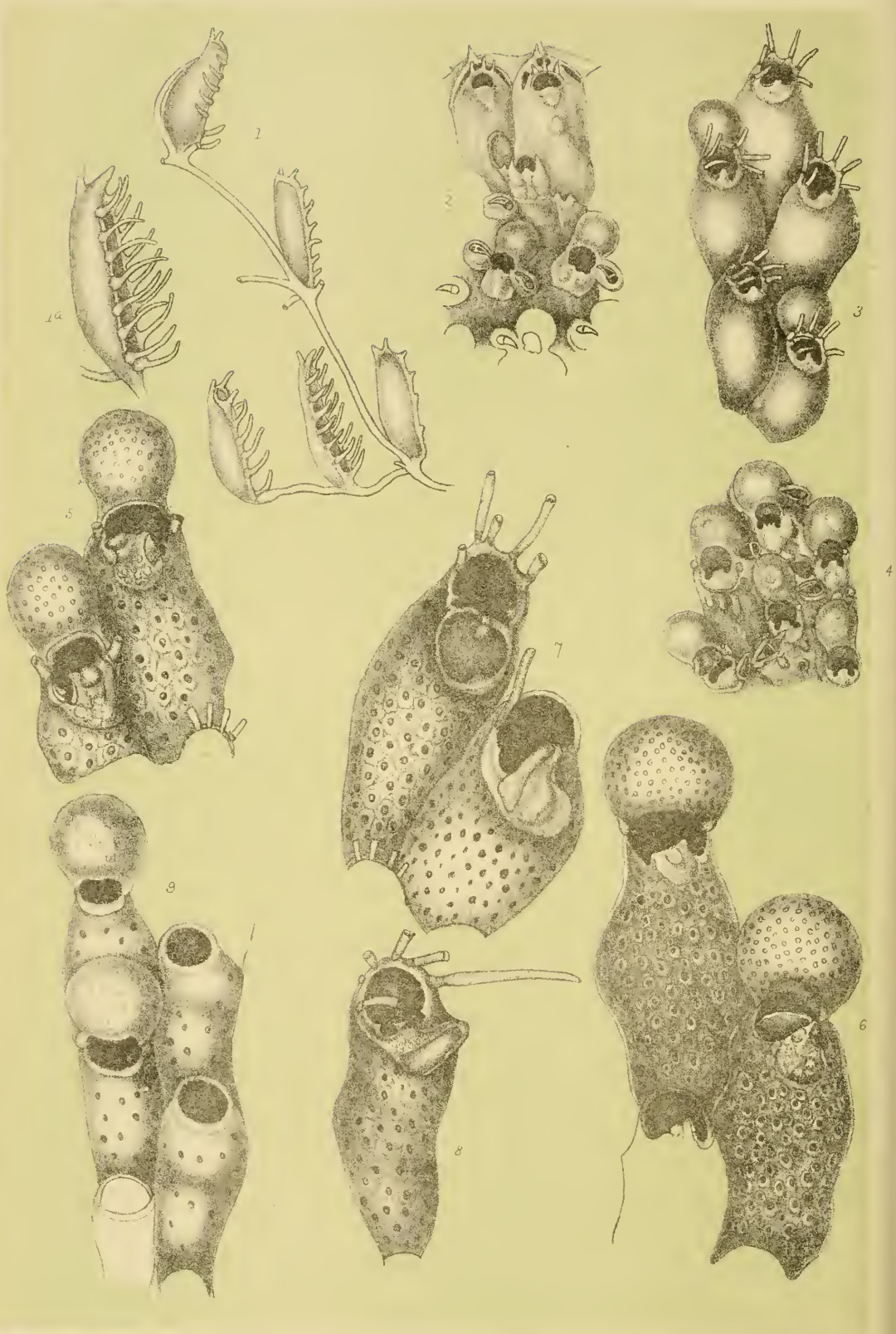
Суслопаров



C. J. Mac Gillivray del. et lith. Wrapper bdr.

Prof. M.ᶜ Coy direxᵗ

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PLATE 116, FIG. 1.

BEANIA MIRABILIS (JOHNSTON).

[Genus BEANIA (JOHNSTON). (Sub-kingd. Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Family Bicellariidæ.)

Gen. Char.—Zoarium creeping or loosely adnate. Zoœcia disjunct, connected by (usually) corneous tubes, erect or decumbent, ovate or boat-shaped, entirely open in front and filled in by a membrane. Usually one or two capitate pedunculate avicularia, perfect, aborted or altered in form.]

DESCRIPTION.—Zoarium sub-erect or decumbent. Zoœcia erect, connected by long, filiform tubes springing from their bases; each cell boat-shaped, with a thickened rim, two sharp spines superiorly and 7–10 sub-marginal, incurved spines or costæ on each side, the uppermost of which is stouter than the others.

REFERENCES.—Busk, Cat. Mar. Pol. Brit. Mus., Pt. i, p. 32, pl. xxiv., Figs. 4, 5; Hincks, Brit. Mar. Polyzoa, p. 96, pl. iv., Figs. 8–10.

Port Phillip Heads, Mr. J. B. Wilson.

This exceedingly beautiful and interesting species, for the discovery of which in Australia we are indebted to Mr. J. B. Wilson, differs in no respect from the well-known European form. The figured specimen occurs on a small piece of sea-weed. The zoœcia are boat-shaped, of a beautiful silvery appearance, and connected by long delicate tubes attached to their bases. The superior thicker spine seems to me to be evidently the homologue of the frequently-modified avicularium in the Diachoridan species.

EXPLANATION OF FIGURES.

PLATE 116.—Fig. 1, portion of zoarium, magnified. Fig. 1*a*, single cell, more highly magnified.

PLATE 116, FIGS. 2 AND 4.

MUCRONELLA TRICUSPIS (HINCKS).

[Genus MUCRONELLA (HINCKS). (Sub-kingd. Mollusca. Class Polyzoa. Order Infundibulata. Sub-ord. Cheilostomata. Fam. Escharidæ.)

Gen. Char.—Zoarium crustaceous or erect and uni- or bi-laminate. Zoœcia with a suborbicular or semicircular orifice, the peristome of which is elevated into a more or less prominent inferior mucro.]

DESCRIPTION.—Zoarium encrusting. Zoœcia distinct, convex; primary mouth semicircular, with 3 or 4 long spines superiorly; secondary mouth with a pouch-like projection of the peristome below, the middle part forming a broad mucro and on each side produced into a sharp process. A raised avicularium on each side of the zoœcium below the mouth, with the long, pointed mandible directed outwards, and projecting

against the side of the mouth of the contiguous cell. Oœcia globular, smooth, occasionally with the margin thickened.

References.—*Mucronella tricuspis*, Hincks, Ann. and Mag. Nat. Hist., Aug. 1881; *M. munita*, MacGillivray, Tr. Roy. Soc. Vict., July 1882.

Port Phillip Heads; Portland, Mr. Maplestone.

Of this common species there are two varieties which I, at one time, considered as distinct species. The one, which may be taken as the type, forms, when young, thin glassy layers on Retepores, shells, &c. The oral spines are long and only seen on the marginal zoœcia. The whole surface of the zoœcia is smooth. In older specimens there is no difference except what is due to increased calcification. The peristome below forms a pouch-like projection, divided superiorly into three parts—a central broader and two lateral sharper projections. The central part is traversed by a shallow, vertical groove which is frequently, as in the figure, replaced by an elevated band or ridge. In the other variety, which I have described as *M. munita*, the surface of the zoœcia is sharply areolated round the margin, and the spines are much thicker and persistent. Even when highly calcified the areolation is frequently retained, although sometimes obliterated. In one beautifully perfect young, growing specimen the marginal spines are thick, with conspicuous chitinous articulations; and many of the zoœcia have a calcareous nodule on the front.

Explanation of Figures.

Plate 116.—Fig. 2, portion of zoarium of normal form, showing the young marginal zoœcia and those fully formed, oœcia, and avicularia projecting on the sides of the mouths of contiguous zoœcia. Spines are seen on the marginal zoœcia, but not on the others. Fig. 4, small portion of the variety *munita*, in which, however, the marginal areolation has disappeared. The bases of the persistent spines are shown.

Plate 116, Fig. 3.

MUCRONELLA LÆVIS (P. McG.).

Description.—Cells broadly ovate, arranged in linear series, separated by deep grooves, slightly convex, smooth; mouth rounded above, a broad denticle deep in the lower lip; peristome raised round the lower lip, produced in the centre into a prominent square or blunt mucro; six stiff, articulated spines on the upper margin. Oœcium small, globose, smooth, three spines showing on each side in front of it.

Reference.—P. H. MacGillivray, Tr. Roy. Soc. Vict., July 1882.

Sorrento, Mr. J. B. Wilson; Port Phillip Heads, on shells, &c.

Of a yellowish-brown color. Allied to *M. peachii*, from which it differs in the greater prominence of the mouth, the larger size of the mucro, the stouter spines (the articulations of which are usually darker colored), and the presence of three spines in front of the oœcium on either side. It is also closely allied to, and may prove to be identical with the *M. teres* described by Mr. Hincks from specimens dredged off Curtis Island.

EXPLANATION OF FIGURE.

PLATE 116.—Fig. 3, portion of specimen, magnified.

PLATE 116, FIGS. 5–8.

MUCRONELLA VULTUR (HINCKS).

DESCRIPTION.—Zoarium loosely attached or in hemeschara form. Cells large, distinct, surface cribriform, with numerous, slightly raised, circular foramina; mouth semicircular, with six spines on the upper margin; inside the lower lip a broad denticle, and on each side, separated by a rounded sinus, a sharp tooth; in front of the median denticle the peristome forms a large mucro, with a large avicularium on one side, the sharp point of the mandible of which is directed upwards. Occasionally a large avicularium, with a broad, blunt, tongue-shaped mandible on the front of a cell. Oœcium large, globular, closely and finely punctate, with, usually, a sharp point on each side of the opening.

REFERENCE.—Hincks, Ann. and Mag. Nat. Hist., Aug. 1882.

Port Phillip Heads; Portland, Mr. Maplestone; Warrnambool, Mr. Watts.

In this large and handsome species the zoœcia are of great size, and the massive mucro, with its long, pointed, lateral avicularium, is very conspicuous. The front of the mucro is frequently elevated into a stout knob or process. The zoœcia posteriorly are quadrate, and have very frequently a large round pore, usually situated about the centre of the upper margin, probably indicating the attachment of a radical fibre. It is nearly allied to *M.* (*Lepralia*) *Ellerii* (McG.), of which it ought possibly to rank only as a variety. In *M. Ellerii* the primary mouth is of the same structure, but the central mucro is smaller (although frequently with the projecting process), and there are usually additional blunt processes at the sides of the mouth. The zoœcia, moreover, are

oblique ; and the oœcia are broader, the inferior angles not so sharply pointed, and there is a smooth space in front without any punctation.

Explanation of Figures.

Plate 116.—Fig. 5, two mature zoœcia with oœcia, showing also the process on the mucro. Fig. 6, two cells from another specimen. Fig. 7, younger cells from another specimen, showing the growth of the mucro. Fig. 8, single marginal cell, showing the central and lateral denticles.

Plate 116, Fig. 9.

CYCLICOPORA LONGIPORA (P. McG.).

[Genus CYCLICOPORA (Hincks). (Sub-kingd. Mollusca. Class Polyzoa. Order Infundibulata. Sub-ord. Cheilostomata. Fam. Escharidæ.)

Gen. Char.—Zoarium encrusting or loosely adnate. Zoœcia elongated ; mouth suborbicular, turned forwards, with a slightly-thickened margin. No avicularia. Oœcium prominent.]

Description.—Zoœcia much elongated, distinct, arranged in linear series, convex ; surface smooth and sparsely punctured ; mouth nearly circular, with the lower lip usually slightly straightened, margin thickened. Oœcium large, rounded, smooth.

Reference.—*Lepralia longipora*, P. H. MacGillivray, Tr. Roy. Soc. Vict., July 1882 ; *Cyclicopora prœlonga*, Hincks, Ann. and Mag. Nat. Hist., Oct. 1884.

Port Phillip Heads, mostly on calcareous nodules, common.

Explanation of Figure.

Plate 116.—Fig. 9, portion of specimen, magnified.

The specimens and descriptions for the *Polyzoa* on this plate have been contributed by Mr. MacGillivray.

Frederick McCoy.

ZOOLOGY OF VICTORIA

(Polyzoa)

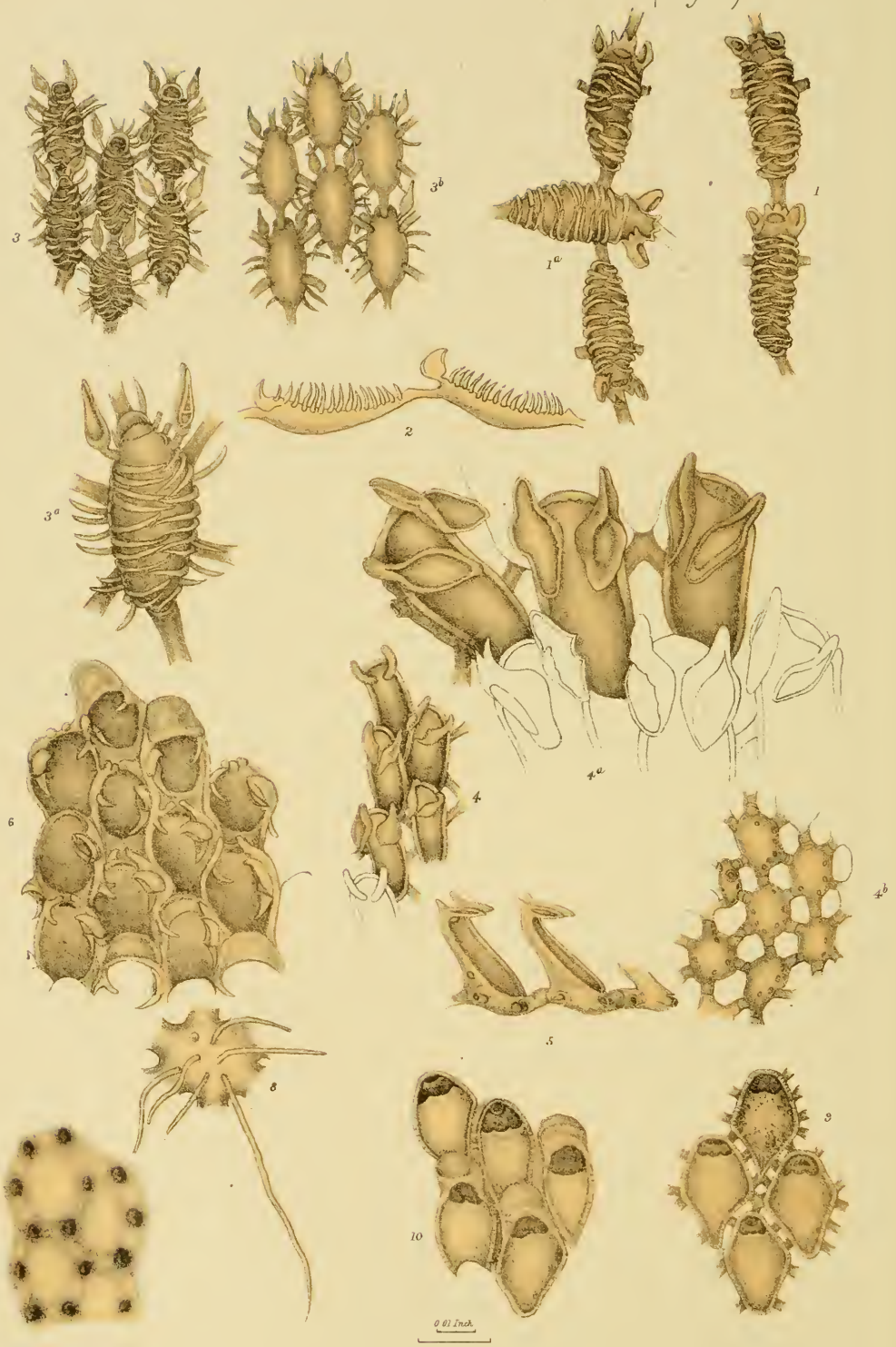

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PLATE 117, FIGS. 1 AND 2.

BEANIA DECUMBENS (P. McG.).

[Genus BEANIA (JOHNSTON). (Sub-kingd. Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Family Bicellariidæ.)

Gen. Char.—Zoarium creeping or loosely adnate. Zoœcia disjunct, connected by (usually) corneous tubes, erect or decumbent, ovate or boat-shaped, entirely open in front, and filled in by a membrane. Usually one or two capitate pedunculate avicularia, perfect, aborted or altered in form.]

DESCRIPTION.—Zoœcia much elongated; two or three short spines at the top; 14–16 long spines on each side, arching over the front of the cell and those of opposite sides interdigitating; at each upper angle a small capitate avicularium; connecting tubes springing from the extremities or sides, so that the cells are entirely decumbent.

REFERENCE.—P. H. MacGillivray, Tr. Roy. Soc. Vict., Dec. 1881.

Port Phillip Heads; first found by Mr. J. Bracebridge Wilson. Spreads in long, irregular lines over calcareous nodules. The connecting tubes are very short, and the zoœcia are arranged end to end, the branches, however, originating from the sides of the zoœcia. In many zoœcia there are one or two radical tubes from the sides, fixing them to the body on which they grow.

I have elsewhere given reasons for including most of the species of Diachoris in the present genus. The zoœcium in such a species as *D. spinigera*, as pointed out by Hincks (Polyzoa, p. 66), is identical in structure with that of a typical Beania. The number of the connecting tubes, the seemingly constant junction of each cell with six others, and, especially, the presence of capitate avicularia, constituted the reason for separating Diachoris; but Hincks has described a species, *D. intermedia*, in which the connecting tubes are four, and the symmetrical pattern is lost; and in Heller's *D. hirtissima* and the allied *B. conferta* (McG.) there are no avicularia. The character of the genus Beania, as now defined, depends on the structure of the cell, the margins being raised and front entirely open or membranous, their disjunction and connection with each other by tubes, and the presence of one or two perfect or modified capitate avicularia at or towards the oral end of the cell.

The systematic position of the genus is somewhat doubtful, but on the whole I agree with Mr. Hincks in referring it to

the Bicellariidæ. It is also closely related to the Membraniporæ through the very interesting *B. radicifera*, in which the original disjunction of the cells is shown by the short, thick, calcareous connection seen behind, and the avicularia, although sessile, are evidently a modification of the capitate form.

Explanation of Figures.

Plate 117.—Fig. 1, two zoœcia of a series arranged end to end. Fig. 1*a*, single zoœcium with the first zoœcia of two branches springing from the sides. Fig. 2, outline of side view, to show the position of the attachment of the connecting tubes.

Plate 117, Fig. 3.

BEANIA COSTATA (Busk sp.).

Description.—Zoarium adnate or free; zoœcia connected with six others by corneous tubes; boat-shaped, rounded at either end; 4–6 spines above the mouth, and about 10 or 12 long incurved spines on each side of the aperture bending over the front, and those of opposite sides interdigitating; posterior surface of cells smooth; a capitate avicularium on each side opposite the mouth, usually directed upwards.

Reference.—*Diachoris costata*, Busk, *Challenger* Polyzoa, p. 60, xxiv. f. 4.

Port Phillip Heads.

This species is allied to the *D. spinigera*, from which, however, it may readily be distinguished. The zoœcia are much smaller, the marginal spines more numerous and longer, and the avicularia are smaller, narrower, and more elongated.

Explanation of Figures.

Plate 117.—Fig. 3, group of zoœcia, magnified. Fig. 3*a*, single zoœcium, more highly magnified; the outward direction of some of the marginal spines is owing to the irregular contraction of the sides of the cell in the dried specimen. Fig. 3*b*, back view of portion of same specimen.

Plate 117, Figs. 4 and 5.

BEANIA CROTALI (Busk sp.).

Description.—Zoarium loosely adnate or suberect; zoœcia erect, quadrate, each joined to six others by corneous tubes; from each upper angle a large lanceolate process (a modified avicularium) is directed downwards and inwards; posterior surface with several perforations at the base and on the sides.

Reference.—*Diachoris Crotali*, Busk, Cat. Mar. Pol. Brit. Mus., pt. 1, p. 54, t. lxvi., figs. 1 and 2.

Port Phillip Heads ; Portland, Mr. Maplestone.

The zoarium is partly free or adnate, and very loosely connected with the object on which it rests. The zoœcia are nearly erect, oblong. Each is connected with six others by tubes springing from the bases (not the sides and anterior extremity) of the zoœcia, the tubes thus forming a horizontal network from which the zoœcia are directed upwards. At each upper angle of the zoœcia there is articulated a lanceolate leaf-like process, the upper and narrower end of which forms a rounded knob. This process is hollowed on one surface, and has a prominent ridge on the other. There is no appearance of mandible, but there can be no doubt of its being a modified avicularium. At the base of the zoœcium, when viewed posteriorly, several rounded markings or openings are usually seen near the edge, mostly to one side, and they occasionally occur also on the sides of the erect part.

Explanation of Figures.

Plate 117.—Fig. 4, anterior view of portion of a specimen. Fig. 4*a*, portion of the same, more highly magnified. Fig. 4*b*, posterior view of same. Fig. 5, side view of two zoœcia.

Plate 117, Figs. 6 to 8.

BEANIA RADICIFERA (Hincks sp.).

Description.—Zoarium attached by numerous radical tubes springing from the backs of the zoœcia; zoœcia large; aperture entirely membranous or slightly filled in below by a thin calcareous plate; two very short spines or tubercles above the mouth, and a long, incurved, blunt or occasionally furcate, rigid spine on one side, a short distance below the mouth; on the opposite side a large, sessile avicularium rising from a distinct broad base. Oœcia large, rounded, granular and pitted. Posteriorly, the zoœcia distinct, but each united by short calcareous tubes with six others, the spaces between the tubes appearing as round deep depressions.

Reference.—*Membranipora radicifera*, Hincks, Ann. and Mag. Nat. Hist., July 1881.

Port Phillip Heads, on mud and sponges.

This is in many respects a most interesting form, marking, as it does, the transition from Beania (including Diachoris) to Membranipora. The zoœcia with the slight filling in inferiorly are Membraniporidan; but, although they are united in front, posteriorly they present the characteristic arrangement of Diachoris, the rounded openings seen being the spaces between the connecting tubes of the adjacent cells, which, instead of being long and chitinous, are here short and calcareous. The avicularium is also

transitional. It is not capitate, but has a broad calcareous basis, clearly representing the pedicle of the ordinary capitate form. The mode of attachment is peculiar, the zoarium being fixed by numerous radical tubes springing from the backs of the cells.

Explanation of Figures.

Plate 117.—Fig. 6, front view of portion of specimen. Fig. 7, back view, showing connection of each zoœcium with six others by short, thick, calcareous tubes. Fig. 8, single zoœcium from another specimen, showing a few radical fibres.

Plate 117, Fig. 9.

AMPHIBLESTRUM PATELLARIUM (Moll sp.).

Description.—Zoœcia slightly separated and connected by short tubes, oval and lozenge-shaped; margins raised, crenulated; lower two-thirds filled in by a minutely granular calcareous expansion; aperture nearly semicircular, occasionally somewhat trifoliate. Oœcia rounded, smooth, with a thickened rim below.

References.—*Mollia patellaria*, Smitt, Flor. Bryozoa, Pt. ii., p. 12, fig. 72 = *Diachoris patellaria*, Waters, Ann. and Mag. Nat. Hist., Feb. 1879 = *Membranipora patellaria*, P. H. MacGillivray, Tr. Roy. Soc. Vict., Dec. 1881.

Port Phillip Heads.

This species agrees with Beania and Diachoris in nothing but the disjunction of the cells; otherwise it is undoubtedly an *Amphiblestrum*, allied to *A. Rossellii*. It agrees perfectly with the form described by Waters, from the Bay of Naples, as *Diachoris patellaria* var. *multijuncta*. The cells are only slightly separated, and are sometimes so close that the connecting tubes cannot be distinguished. Each cell is connected with the adjacent ones by usually about twelve tubes. In the typical form, as figured by Smitt and Waters, the connecting tubes are much fewer. These naturalists consider Heller's *D. simplex* as the same species, which they refer to Moll's *Eschara patellaria*. I have not seen Moll's work, but Heller's figure certainly looks very different. No avicularia have been seen.

Explanation of Figures.

Plate 117. — Fig. 9, group of zoœcia, magnified. Fig. 10, portion of another specimen, showing oœcia.

I am indebted for the specimens and descriptions of the Polyzoa on this plate to Mr. MacGillivray.

Frederick McCoy.

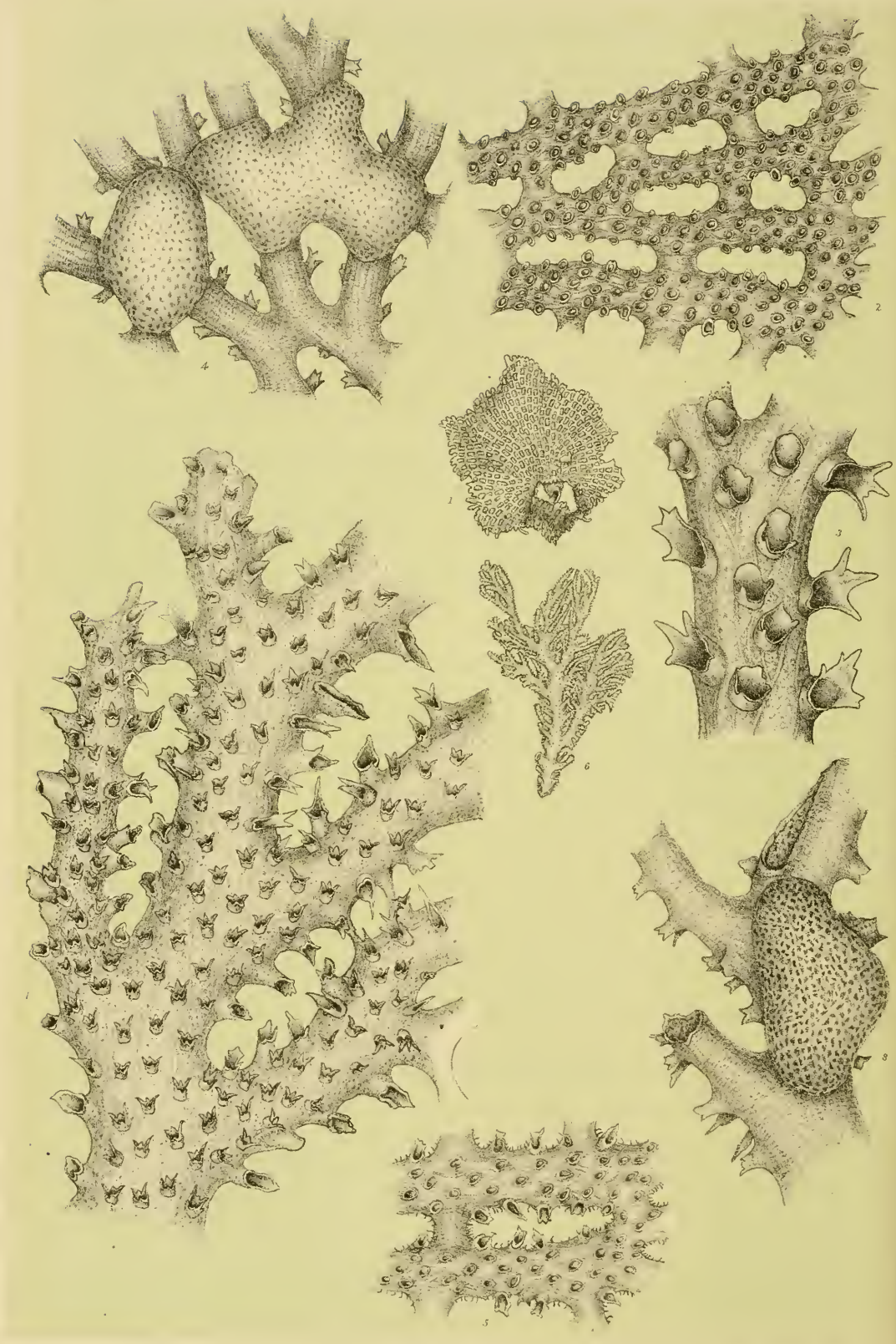


PLATE 118, FIGS. 1 TO 5.

HORNERA FOLIACEA (P. McG.).

[Genus HORNERA (LAMX.). (Sub-kingd. Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cyclostomata. Family Idmoneidæ.)

Gen. Char.—Zoarium branched, branches distinct, anastomosing or connected by transverse bars. Zoœcia distinct, opening irregularly on one side of the branches. Oœcia dorsal or anterior.]

DESCRIPTION.—Zoarium rising from a discoid base, forming a foliaceous expansion, composed of sub-parallel branches dichotomously divided and connected by transverse bars forming oblong fenestræ; anterior surface divided into elongated, more or less rhomboidal, spaces by the approximation, at intervals, of slightly elevated longitudinal ridges; zoœcia opening in these spaces, exserted, the peristome produced and lacerated especially on the expanded outer lip; posterior surface longitudinally sulcate, the elevations between the sulci transversely marked by shallow grooves. Oœcia very large, bulging, extending usually over several branches, deeply and closely pitted.

REFERENCE.—*Hornera foliacea*, P. H. MacGillivray, Tr. Roy. Soc. Vict. = *Retihornera foliacea*, Busk, Brit. Mus. Cat., Marine Polyzoa, Part iii., p. 19, pl. xiii., figs. 1 and 2, pl. xix.

Port Phillip Heads; Portland, Mr. Maplestone; Western Port and Sealers' Cove, Baron von Mueller.

This beautiful and common species rises from a discoid base, spreads usually at first in a flabelliform manner, but ultimately becomes more or less convoluted, and frequently attains a size of two inches. The fenestræ are oblong, varying considerably in size according to age, sometimes narrower than the branches, sometimes as wide or even wider. The zoœcia are exserted in perfect specimens, with the peristome lacerated; in those at the margins of the branches the outer lip is much expanded, forming a laciniated lip with usually two or three teeth. There are seldom more than two or three rows of zoœcia in a branch, and their occurrence on the cross-bars is very infrequent. The surface of the branches is faintly granular and traversed by longitudinal, slightly elevated ridges, the approximation of which, at intervals, forms elongated, irregular, somewhat rhomboidal spaces in which the orifices of the cells are situated. The posterior surface is longitudinally sulcate, the intermediate elevations being marked by close transverse furrows. The depth of the posterior sulci, the distinctness of the

anterior ridges, and the prominence of the cell-mouths, of course, vary much with age. In some specimens numerous, small, sharp-pointed spines project from the edges of the fenestræ. These, however, are usually absent, even in perfect specimens. The oœcia are very large and prominent. They are seldom confined to one branch, but usually extend over several, generally bulging in the direction of the axis of each branch involved.

The genus *Retihornera* has been proposed by Kirchenpaur and adopted by Busk for the fenestrate species of *Hornera*. Such a species as *H. robusta* (McG.) shows the transition, and I cannot see any sufficient reason for dividing the old genus.

Explanation of Figures.

Plate 118.—Fig. 1, specimen, natural size. Fig. 2, portion of the front of a specimen, magnified. Fig. 3, portion of another specimen, more highly magnified, to show the expanded, lacerated outer lip of the peristome of the zoœcia. Fig. 4, portion of the back of a specimen, showing two oœcia. Fig. 5, part of a specimen, with small spines on the edges of the fenestræ.

Plate 118, Figs. 6 to 8.

HORNERA ROBUSTA (P. McG.).

Description.—Zoarium composed of one or more thick, flattened stems, from which lateral branches extend on either side, these lateral branches frequently anastomosing with each other and with those from adjacent stems; zoœcia arranged in numerous longitudinal rows, separated by raised ridges; mouth in the central zoœcia slightly exserted, in the lateral and those near the edge the peristome produced and irregularly dentate; posterior surface of zoarium longitudinally sulcate, the narrow intermediate ridges thickly punctate. Oœcium large, posterior, elongated in the direction of the branch, pitted.

Reference.—P. H. MacGillivray, Tr. Roy. Soc. Vict., Dec. 1882.

Port Phillip Heads.

H. robusta attains a considerable size, a specimen dredged at Port Phillip Heads being two and a half inches by one and three-quarters. Its mode of growth is very characteristic. It originates from a single stem, usually subcylindrical, but sometimes broad or

indistinct. This divides usually into two, which again subdivide into several branches. From the main branches others spread on either side in a penniform manner, and these again give rise to smaller branches. These anastomose irregularly together, and the large branches from the neighbouring main stems frequently unite in the same manner. Some specimens consist only of a single stem with lateral branches. The resulting zoarium in those with several stems is more or less expanded and curled. The anastomoses are very irregular, and do not produce anything like the regular fenestrate arrangement seen in *Retihornera foliacea.* They seem to be frequently caused by the accidental contact of the peristomes of zoœcia in contiguous branches.

Explanation of Figures.

Plate 118.—Fig. 6, specimen, natural size. Fig. 7, portion of a specimen, showing the anterior surface and the mode of formation of the anastomoses, magnified. Fig. 8, small portion of the back of another specimen, showing an oœcium.

Mr. MacGillivray has kindly contributed the specimens and descriptions of these species of *Retihornera* and *Hornera.*

Frederick McCoy.

PLATE 119.

PHANEROPTERA VALIDA (WALK.).

THE SMALLER GREEN GUM-TREE GRASSHOPPER.

[Genus PHANEROPTERA (AUD. SERV.) (Sub-kingd. Articulata. Class Insecta. Order Orthoptera.* Section Saltatoria. Family Gryllidæ.)

Gen. Char.—Head small, narrow, oval, vertical; antennæ close together at base, longer than the body, setaceous, multiarticulate, first joint large, elongate, second spheroidal, capillary from the third joint; eyes small, prominent; no ocelli; labrum small, rounded; mandibles moderate, slender; maxilliary palpi with last joint twice as long as that of labial palpi, both truncated at tip. Legs long, slender; posterior femora very long, smooth; tibiæ long; spines of legs few and small; anterior tibiæ with a basal swelling, having a distinct oval cavity; tarsi 4-jointed, third joint narrow, bilobed. Elytra long, narrow, extending beyond the abdomen when at rest, and having large stridulating organ on inner base in the males; wings large, extending beyond the elytra. Prothorax short, flat or concave above, posterior edge sometimes raised; presternum smooth; mesosternum and metasternum concave, with raised lateral borders. Abdomen narrow; subanal plate of male bifurcate at tip, the two branches extending beyond the abdomen; two upper appendages long, setaceous, pubescent, those of the male a little arched upwards, and much larger than in the female; ovipositor very short, arched upwards from base, rounded at tip; valves flat, smooth above.

Sub-genus, *Phaneroptera* proper: Prothorax oblong, nearly parallel-sided and flat above, keeled at sides where deflected; legs and thighs nearly smooth.]

DESCRIPTION.—*Male:* Head brown, with green tinge; eyes very prominent, greenish-brown; antennæ very slender, pale brown; prothorax with a flat or slightly concave, oblong disc, sides bent down at right angles with a strong, straight, pale-yellowish keel on each side at the flexure; rest of the surface pea-green; anterior margin slightly concave, posterior edge convex. Presternum narrow, sulcate along middle, meso- and meta- sternum broader, slightly convex with raised lateral edges, deeply bilobed behind. Upper abdominal appendages long, slightly curved upwards; lower pair very short. Legs very long, slender; femora and tibiæ with few very minute spines, proximal half of hind femora moderately thickened; anterior pair of tibiæ dilated at base for oval drum cavity; all the legs pale brown, except thick part of hind femora, which are green on outer side. Tegmina, or anterior wings, narrow, about 2 lines shorter than posterior wings when at rest; larger areolets irregular, not distinctly marked; pea-green, except the large triangular part of inner base carrying the iridescent, transparent, stridulating spots, which are pale brown. Hind wings colorless, with pale pink and green iridescent reflection; a triangular, opaque, pea-green spot, 2 lines long, on anterior half of apex (which opaque green portion projects beyond the tegmina when at rest); abdomen brown above, green below; tibiæ, tarsi, distal half of hind thighs and palpi, pale brown; angle at sides of thorax, continued by inner or posterior veins of tegmina, when at rest, pale yellowish. Expanse of tegmina, 3 ins. 1 line; length of body, 1 in. Proportional measurements: Length of lower wings, 1 in. 6 lines, taken as unity; length of anterior wings, or tegmina, $\frac{100}{100}$; width of tegmina, $\frac{9}{100}$; length of prothorax, $\frac{16}{100}$; width of prothorax, $\frac{12}{100}$; length of abdomen, $\frac{40}{100}$; length of antennæ, $\frac{99}{100}$; hind femora, $\frac{60}{100}$; hind tibiæ, $\frac{65}{100}$. *Female:* General structure

* Although the name *Dermaptera* has some claims to priority for this Order, I have used *Orthoptera*, as employed by so many writers upon the group.

and color like male, except inner bases of tegmina, which are green, and finely reticulated like the rest. Length of tegmina, 1 in. 7 lines; length of body, 1 in. 1 line.

Reference.—Cat. Derm. Salt., Pt. 2, p. 352.

The *Phaneropteræ* are the most elegantly slender of all the *Gryllidæ*, not only the small head and narrow body, but the narrowness of the anterior pair of wings (or tegmina, or elytra) aiding this characteristic appearance. The distance the hind wings project behind the tips of the tegmina when at rest, and the great length of the abdominal appendages of the male, are also peculiarities. The subanal plate of the male is sometimes double, in other species only bifurcate at tip; it is usually curved upwards. The shortness of the ovipositors of the female separates the *Phaneropteræ* at a glance from *Locustidæ*.

Like all the *Phaneropteræ*, the posterior wings when folded extend like a tail beyond the ends of the elytra or anterior wings when at rest, the exposed tips being usually colored like the elytra and of the same consistence, differing in these respects from the transparent membranous rest of the wing.

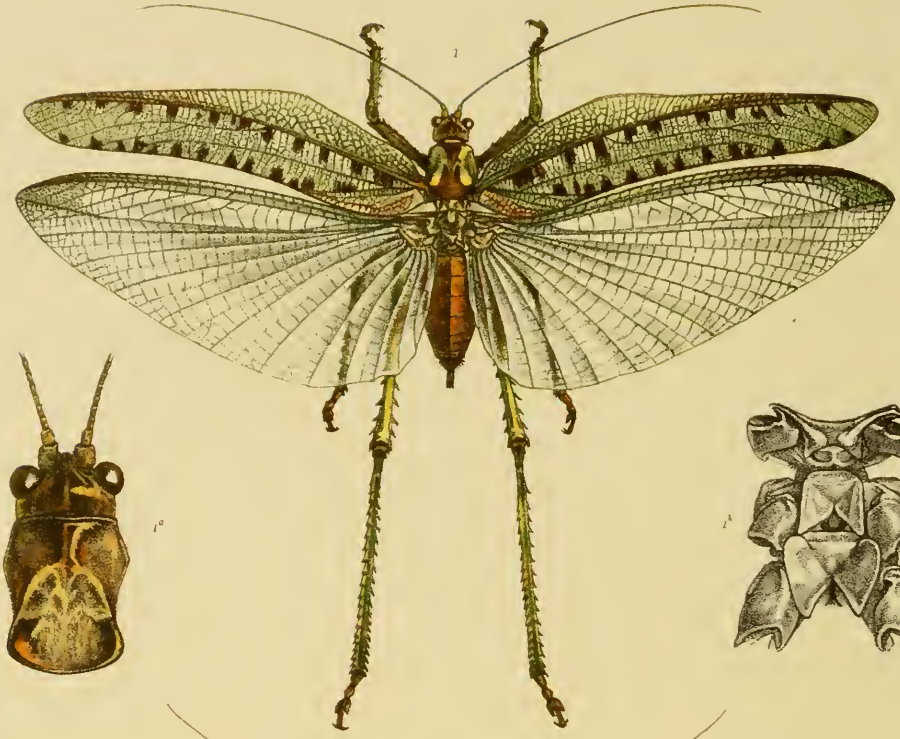
This species is common on young gum trees near Melbourne, the tint of which it so closely agrees with that it is by no means easy to detect the individuals loudly shirring or chirping on all sides of the observer.

It has not been figured before.

Explanation of Figures.

Plate 119.—Fig. 1, male, natural size, in flying position. Fig. 1*a*, front view of head, magnified 3 diameters, showing absence of ocelli and form of front. Fig. 1*b*, labrum, or upper lip, showing its simple rounded edge, magnified 5 diameters. Fig. 1*c*, one of the strong cutting mandibles, magnified 5 diameters. Fig. 1*d*, one of the slender maxillæ, showing the hood over the serrated terminal joint and the maxillary palpi. Fig. 1*e*, labium, or under lip, showing its terminations and palpi, magnified 5 diameters. Fig. 1*f*, head and thorax viewed from above, magnified 3 diameters, showing the flat oblong disc, with the rectangularly-deflected sides. Fig. 1*g*, hind leg, magnified 2 diameters. Fig. 1*h*, anterior leg, showing swelling and drum cavity in base of tibia. Fig. 1*i*, tarsus viewed from below, magnified 3 diameters, to show the bilobed third joint. Fig. 1*k*, ditto, viewed from the side. Fig. 1*l*, sternum, to show the bilobed middle and hinder pieces, magnified 3 diameters. Fig. 1*m*, anal plate and appendages of end of abdomen of male, magnified 3 diameters. Fig. 1*n*, elytra, magnified two diameters, showing the neuration and large, clear stridulating organs at base. Fig. 2, female, viewed in profile, with the wings at rest, to show the projection of the wings behind the tips of the elytra, and the extension of both far behind the end of the abdomen. Fig. 2*a*, elytra, or tegmina, magnified 2 diameters, to contrast the neuration with that of the male, and to show the absence in the female of the transparent stridulating spaces at base. Fig. 2*b*, side view of plates of ovipositor and appendages at end of abdomen of female, magnified 3 diameters. Fig. 3, another specimen, in the walking position, seen from above, to show the overlapping of the left elytron.

Frederick McCoy.


1
1a
1b

2
1c
1d

PLATE 120.

PHANEROPTERA (EPHIPPITYTHA) TRIGINTIDUO-GUTTATA (SERV.).

THE THIRTY-TWO SPOTTED GRASSHOPPER.

[Genus PHANEROPTERA (AUD. SERV.). (Sub-kingd. Articulata. Class Insecta. Order Orthoptera. Section Saltatoria. Family Gryllidæ.)

Gen. Char. — Head small, narrow, oval, vertical; antennæ close together at base, longer than the body, setaceous, multiarticulate; 1st joint large, elongate; 2nd spheroidal; capillary from the 3rd joint. Eyes small, prominent; no ocelli; labrum small, rounded; mandible moderate, slender; maxillary palpi with last joint twice as long as that of labial palpi, both truncated at tip. Legs long, slender; posterior femora very long, smooth; tibiæ long; spines of legs few and small; anterior tibiæ with a basal swelling, having a distinct oval cavity; tarsi 4-jointed, 3rd joint narrow, bilobed. Elytra long, narrow, extending beyond the abdomen when at rest, and having large stridulating organ on inner base in the males; wings large, extending beyond the elytra. Prothorax short, flat or concave above, posterior edge sometimes raised; presternum smooth; mesosternum and metasternum concave, with raised lateral borders. Abdomen narrow; subanal plate of male bifurcate at tip, the two branches extending beyond the abdomen; two upper appendages long, setaceous, pubescent, those of the male a little arched upwards and much larger than in the female; ovipositor very short, arched upwards from base, rouned at tip; valves flat, smooth above.

(Sub-genus Ephippitytha) (Serville) — Prothorax saddle-shaped, hollowed transversely, narrow and convex in front above, abruptly widening into a rounded dilated portion raised behind. Thighs and legs strongly spinous. Front with one tubercle.]

DESCRIPTION.—*Female:* Body yellow ochre, glossy; top of head blackish-brown; a rusty yellow spot under each eye. Frontal tubercle small, conical; point not reaching front of basal joint of antennæ. Prothorax saddle-shaped, hollowed on the deflected sides; upper surface contracted in front, widening abruptly behind; obliquely inclined upwards from the anterior to the posterior margin, with a median, triangular, reddish-brown spot; sides green, bent down, long, rounded; posterior portion brown, elevated, flat, rounded at the base of the elytra; sides of this plate with a black, polished, semilunate spot, wider in front. Elytra rather opaque, extending nearly an inch beyond the end of the abdomen, dull yellowish-green; anterior border wide, sinuous, narrowed towards the tip, which is rounded and of a duller color; the reticulate neuration of this margin coarse, irregular; each elytron with 8 to 10 oblong black spots in a longitudinal line on a paler streak, touching the posterior or inner margin of great marginal vein; 8 to 13 other similar spots forming an irregularly placed row on the inner margin of the elytra. Stridulating organ opaque, with reticulate neuration like that of anterior margin; hind wings transparent, with slightly-opaque green tips. Legs green, with transverse brown spots; hind thighs with 2 rows of moderate spines below; hind tarsi with 2 rows of moderately large spines above, 2 anterior pairs of legs, nearly smooth; 2 hinder joints of sternum green, with the deflected edges yellow. Base of anterior tibiæ swollen, with a large, oval, talc-like, glossy plate covering the cavity on both the outer and inner sides. Antennæ slender, setaceous, of very numerous, indistinct, cylindrical joints beyond the basal and 2nd joints, which are enlarged, the basal joint slightly exceeding the frontal tubercle in length. Length of body, 1 in. 4 lines; length of each of the tegmina, 2 ins. 1 line; greatest width of same, 5 lines; length of

hind wing, 2 ins. 2 lines; greatest width of same, 1 in.; length of antennæ, 1 in. 8 lines; length of hind thigh, 1 in. 4 lines; length of hind tibia, 1 in. 4 lines; length of hind tarsi, 2 lines; length of ovipositor, 2 lines. *Male:* Coloring as in female. Length from frontal tubercle to end of anal plate, 1 in. 1 line; length of tegmina, 1 in. 11 lines; greatest width of same, 6 lines; length of hinder wings, 2 ins. 1 line; greatest width of same, 10 lines; length of antennæ, 2 ins. 10 lines; length of hind thigh, 1 in. 2 lines; length of hind tibia, 1 in. 4 lines; length of hind tarsi, 3 lines. Anal plate compressed, upturned, bifid at extremity, half its length beyond end of abdomen. Two upper appendages of end of abdomen conical, $1\frac{1}{2}$ lines long; length of anal plate, 2 lines.

Reference.—Aud. Serville, Hist. Nat. des Insect. Orthopt., p. 422 = *E. maculata,* Evans, Trans. Ent. Soc., v. iv., p. 303, t. 21, fig. *f. c.*

The black spots not only vary in number on the usual part of the elytra, but some have a few small ones on the anterior part of the elytra, and one near the green tip of the wing, as shown in our figures of two varieties, differing in those respects. It is one of the rarest of our Grasshoppers, one of the two examples in the Museum having been found in May 1876 at Emu Plains, near Benalla, by Mr. A. F. Bradshaw, to whom we are indebted for it. Not figured of the colors of life before.

Explanation of Figures.

Plate 120.—Fig. 1, female in flying position, natural size. Fig. 1*a*, top of head and disc of thorax, to show the saddle-shaped, narrow, keeled, anterior portion and wide flattened posterior part of disc, magnified 3 diameters. Fig. 1*b*, sternum, magnified 3 diameters. Fig. 1*c*, side view of end of abdomen, showing ovipositor and appendages, magnified 3 diameters. Fig. 1*d*, the same, viewed from above. Fig. 2, male, flying, natural size, of variety, showing small spots on anterior margin of elytra, and one larger spot near tip of each hind wing.

Frederick McCoy.

CONTENTS OF DECADES.

N.B.—The originals of all the Figures are in the National Museum, Melbourne.

DECADE I.

PLATE 1.—The Black Snake (Pseudechys porphyriacus, Shaw sp.).
PLATE 2.—The Copper-head Snake (Hoplocephalus superbus, Günth.).
PLATE 3.—The Tiger Snake (Hoplocephalus curtus, Schl. sp.).
PLATE 4.—The Australian Bream (Chrysophrys Australis, Günth.).
PLATE 5.—The Spiny-sided Butterfly-Gurnard (Lepidotrigla Vanessa, Rich. sp.).
PLATE 6.—The Kumu Gurnard (Trigla Kumu, Lesson and Garn.).
PLATE 7.—The Australian Giant Earth-worm (Megascolides Australis, McCoy).
PLATE 8.—Lewin's Day-moth (Agarista Lewini, Boisd.).
The Loranthus Day-moth (Agarista Casuarinæ, Scott).
The Vine Day-moth (Agarista Glycine, Lewin sp.).
PLATE 9.—Pieris (Thyca) Harpalyce (Don. sp.).
PLATE 10.—Pieris (Thyca) Aganippe (Don. sp.).

DECADE II.

PLATE 11.—The Little Whip Snake (Hoplocephalus flagellum, McCoy). The White-lipped Snake (Hoplocephalus coronoides, Günth.).
PLATE 12.—The Death Adder (Acanthophis Antarctica, Shaw sp.).
PLATE 13.—The Carpet Snake (Morelia variegata, Gray).
PLATE 14.—The Gippsland Perch (Lates colonorum, Günth.).
PLATE 15.—The Murray Lobster (Astacoides serratus, Shaw sp.).
PLATE 16.—The Salmon Arripis (Arripis truttaceus, Cuv. sp.). Adult.
PLATE 17.—Ditto of the younger forms and coloring.
PLATE 18.—The Horse Mackerel (Trachurus trachurus, Lin. sp.).
PLATE 19.—The Small-scaled Rock Cod (Lotella callarias, Günth.).
PLATE 20.—The Australian Rock Cod (Pseudophysis barbatus, Günth.).

DECADE III.

PLATE 21.—The Sea-Leopard Seal (Stenorhynchus leptonyx, de Blainv. sp.).
PLATE 22.—The Yellow-sided Dolphin (Delphinus Novæ Zealandiæ, Quoy and Gaim.).
PLATE 23.—The Common Brown Snake (Diemenia superciliosa, Fisch.).
The Small-scaled Brown Snake (Diemenia microlepidota, McCoy).
The Shield-fronted Brown Snake (Diemenia aspidorhyncha, McCoy).
PLATE 24.—Catenicella margaritacea (Busk).—C. plagiostoma (Busk).—C. ventricosa (Busk).—C. hastata (Busk.)—C. rufa (McG.).—C. cribraria (Busk).—C. alata (Wyv. Thomson).—C. lorica (Busk).—C. formosa (Busk).—C. elegans (Busk).—C. perforata (Busk).—C. Buskii (Wyv. Thomson).—C. Hannafordi (McG.).—C. crystallina (Wyv. Thomson).—C. carinata (Busk).—C. aurita (Busk).—C. geminata (Wyv. Thomson).—C. cornuta (Busk).—C. intermedia (McG.)
PLATE 25.—Membranipora membranacea (Linn. sp.).—M. perforata (McG.).—M. ciliata (McG.).—M. mamillaris (McG.).—M. umbonata (Busk).—M. pilosa (Linn. sp.).—M. cervicornis (Busk).
PLATE 26.—Membranipora dispar (McG.).—M. Woodsii (McG.).—M. lineata (Linn. sp.).—M. Rosselii (Audouin sp.).—M. Lacroixii (Savigny sp.).
PLATE 27.—The Australian Rockling (Genypterus Australis, Cast.).
The Yarra Blackfish (Gadopsis gracilis, McCoy).
PLATE 28.—The Southern Mackerel (Scomber pneumatophorus, De la Roche).
PLATE 29.—The Yabber Crayfish (Astacoides bicarinatus, Gray sp.).
PLATE 30.—The Large Wattle Goat-Moth (Zeuzera Eucalypti, Boisd. Herr.-Schæf.).

DECADE IV.

PLATE 31.—The Australian Sea-Bear or Fur-Seal (Euotaria cinerea, Péron sp.).
PLATE 32.—The Two-hooded Furina-Snake, Furina bicucullata (McCoy).
PLATE 33.—The Banded Red Gurnet-Perch (Sebastes percoides, Solander sp.).
PLATE 34.—The Angel-fish (Rhina squatina, Lin. sp.).
PLATE 35.—Lepralia circinata (McG.).—L. Cecilii (Aud.).—L. diaphana (McG.).—L. marsupium (McG.).—L. subimmersa (McG.).—L. anceps (McG.).—L. Maplestonei (McG.).
PLATE 36.—Lepralia vittata (McG.).—Membranipora perforata. Lepralia Brogniartii (Aud.).—L. elegans (McG.).—L. pertusa (Esper. sp.).—L. Malusii (Aud. sp.).—L. lunata (McG.).
PLATE 37.—Lepralia ciliata (Linn. sp.).—L. trifolium (McG.).—L. cheilodon (McG.).—L. canaliculata (McG.).—L. larvalis (McG.).—L. diadema (McG.).—L. papillifera (McG.).—L. Ellerii (McG.).
PLATE 38.—Lepralia monoceros (Busk).—L. excavata (McG.).—L. vitrea (McG.).—L. megasoma (McG.).—L. Schizostoma (McG.).—L. Botryoides (McG.).—L. ferox (McG.).—L. pellucida (McG.).
PLATE 39.—Crisia Edwardsiana (D'Orb. sp.).—C. biciliata (McG.).—C. acropora (Busk).—C. setosa (McG.).—C. tenuis (McG.).
PLATE 40.—Saunders' Case-Moth (Metura elongata, Saunders sp.).
The Lictor Case-Moth (Entometa ignobilis, Walk.).

DECADE V.

PLATE 41.—The Lace Lizard (Hydrosaurus varius, Shaw sp.).
PLATE 42.—The Spotted Marsh-Frog (Limnodynastes Tasmaniensis, Günth.).—The Common Sand-Frog (Limnodynastes dorsalis, Gray).
PLATE 43.—The Carpet Shark (Crossorhinus barbatus, Lin. sp.).—The Seven-gilled Shark (Notidanus [Heptanchus] Indicus, Cuv.).
PLATE 44.—The Barracouta (Thersites atun, Cuv.).—The Tunny (Thynnus Thynnus, Lin. sp.).
PLATE 45.—Flustra denticulata (Busk).—Carbasea episcopalis (Busk).—C. dissimilis (Busk).—C. indivisa (Busk).—C. elegans (Busk).—C. pisciformis (Busk).
PLATE 46.—Spiralaria florea (Busk).—Diachoris Magellanica (Busk).—D. spinigera (P. McGil.).—Dimetopia spicata (Busk).—D. cornuta (Busk).—Didymia simplex (Busk).—Calwellia bicornis (Wyv. Thomson).
PLATE 47.—Dictyopora cellulosa (P. McGil.).
PLATE 48.—Eschara obliqua (P. McGil.).—E. dispar (P. McGil).—E. gracilis (Lamx.).—E. platalea (Busk).—E. quadrata (P. McGil.)—E. mucronata (P. McGil.).—Caleschara denticulata (P. McGil.).
PLATE 49.—Cellaria fistulosa (Linn.).—C. hirsuta (P. McGil.).—C. tenuirostris (Busk.).—C. gracilis (Busk).—Nellia oculata (Busk).—Tubucellaria hirsuta (Busk).
PLATE 50.—The Great Black, or Manna Cicada (Cicada mœrens, Germ.).—The Great Green Cicada (Cyclochila Australasiæ, Donov. sp.).

DECADE VI.

PLATE 51.—The Victorian Rhodona (Rhodona Officeri, McCoy).
PLATE 52.—The Black and White Ringed Snake (Vermicella annulata, Gray).
PLATE 53.—The Green and Golden Bell-Frog (Ranoidea aurea, Less. sp.).
PLATES 54-55.—The Australian Aulopus (Aulopus purpurisatus, Rich.).
PLATE 56.—The Hammer-headed Shark (Zygæna malleus, Shaw).—The Common Australian Saw-Fish (Pristiophorus nudipinnis, Günth.).
PLATE 57.—Biflustra perfragilis (McGil.).—B. delicatula (Busk).
PLATE 58.—Cellularia cuspidata (Busk).—Menipea crystallina (Gray sp.).—M. cyathus (Wyv. Thomson).—M. cervicornis (McGil.)—M. tricellata (Busk).—M. Buskii (Wyv. Thomson).
PLATE 59.—Bicellaria tuba (Busk).—B. grandis (Busk).—B. ciliata (Linn).—B. turbinata (McGil.).—Stirparia annulata (Map.).—Bugula neritina (Linn.).
PLATE 60.—Steganoporella magnilabris (Busk. sp.).—Petralia undata (McGil.).

DECADE VII.

PLATE 61.—The Tuberculated Argonaut (Argonauta oryzata, Meusch.).
PLATE 62.—The same seated in its so-called shell or Paper-Nautilus.
PLATE 63.—The Blue-spotted Eagle-Ray (Myliobatis Australis, Macleay).
PLATE 64.—The Long-toothed Bull-Shark (Odontaspis taurus, Raf.).—The Australian Tope Shark (Galeus Australis, Macleay).
PLATE 65.—The Leafy Sea-Dragon (Phyllopteryx foliatus, Shaw sp.).—The Short-headed Sea-horse (Hippocampus breviceps, Pet.)
PLATE 66.—Dictyopora grisea (Lamx. sp.).—D. albida (Kirch.)—(Var. avicularis, P. McGill.).
PLATE 67.—D. Wilsoni (P. McGill.).
PLATE 68.—Idmonea Milneana (d'Orb.).—I. contorta (P. McGill.).—I. radians (Lamk.).
PLATES 69–70.—The Violet-shouldered Phasma (Tropidoderus iodomus, McCoy).—The Red-shouldered Phasma (Tropidoderus rhodomus, McCoy).

DECADE VIII.

PLATE 71.—The Australian Sea-Bear or Fur-Seal (Euotaria cinerea, Péron sp.).
PLATE 72.—The Northern Blue-tongued Lizard (Cyclodus gigas, Bodd. sp.).
PLATE 73.—The Ludrick (Girella simplex, Rich. sp.).
PLATE 74.—The White Shark (Carcharodon Rondeletii, Müll. and Hen.).
PLATE 75.—The Picked Dog-Fish (Acanthias vulgaris, Linn. sp.).
PLATES 76–77.—The Australian Tooth-cupped Cuttlefish (Sepioteuthis Australis, Quoy and Gaim.).
PLATE 78.—Bugula robusta (P. McGil.).—B. cucullata (Busk).—B. dentata (Lamx.).—B. avicularia (Pall.).
PLATE 79.—The Violet-winged Phasma (Acrophylla violascens, Leach sp.).
PLATE 80.—The Large Pink-winged Phasma (Podacanthus typhon, Gray).

DECADE IX.

PLATE 81.—The Gippsland Water Lizard (Physignathus Lesueri, Gray)—(Var. Howitti, McCoy).
PLATES 82–83.—The Murray Tortoise (Chelymys Macquaria, Cuv. sp.).
PLATE 84.—The Murray Golden Perch (Ctenolates ambiguus, Rich. sp.).
PLATES 85–86.—The Murray Cod-Perch (Oligorus Macquariensis, Cuv. and Val. sp.).
PLATE 87.—The Australian Smooth-Hound (Mustelus Antarcticus, Günth.).
PLATE 88.—The Thresher, or Long-tailed Shark (Alopecias vulpes, Linn. sp.).
PLATE 89.—Catenicella intermedia (P. McG.).—C. amphora (Busk).—C. Wilsoni (P. McG.).—C. pulchella (Map.).—C. utriculus (P. McG.).
PLATE 90.—Catenicella fusca (P. McG.).—C. umbonata (Busk).—C. cornuta (Busk).

DECADE X.

PLATE 91.—Gymnobelideus Leadbeateri (McCoy).
PLATES 92–93.—The Long-necked River Tortoise (Chelodina longicollis, Shaw sp.).
PLATE 94.—Opercula of Retepora.
PLATE 95.—Retepora porcellana (P. McGil.).—R. avicularis (P. McGil.).—R. fissa (P. McGil.).
PLATE 96.—Retepora monilifera (P. McGil.).
PLATE 97.—Retepora monilifera (P. McGil.).—R. formosa (P. McGil.).—R. carinata (P. McGil.).
PLATE 98.—Retepora Phœnicea (Busk).—R. aurantiaca (P. McGil.).
PLATE 99.—Retepora granulata (P. McGil.).—R. tessellata (Hincks).—R. serrata (P. McGil.).
PLATE 100.—Goniocidaris tubaria (Lam.).

The foregoing ten Decades form Vol. I.

DECADE XI.

PLATE 101.—The Luth, or Leathery Turtle (Sphargis coriacea, Linn. sp.).
PLATE 102.—The Rugged Stump-tail, or Shingle-back, Lizard (Trachydosaurus rugosus, Gray).
PLATE 103.—The Blackish Australian Worm-Snake (Typhlops nigrescens, Gray sp.).
PLATE 104.—The Basking Shark (Cetorhinus maximus, Linn. sp.).
PLATE 105.—Cellaria rigida (McG.).—Tubucellaria cereoides (Ellis and Solander).—Urceolipora dentata (McG.)—U. nana (McG.).
PLATE 106.—Amphiblestrum punctigerum (Hincks). — A. Flemingii (Busk). — A. permunitum (Hincks).—Pyripora crassa (McG.).—P. catenularia (Jameson).—P. polita (Hincks).—Electra flagellum (McG.). — Bathypora porcellana (McG.).—Biflustra papulifera (McG.).—B. bimamillata (McG.).
PLATE 107.—Catenicellopsis pusilla (J. B. Wilson). — C. delicatula (J. B. Wilson). — Calpidium ponderosum (Goldstein sp.).
PLATE 108.—Calpidium ornatum (Busk).—Chlidonia dædala (Wyv. Thomson).
PLATE 109.—The Great Green Gum-tree Grasshopper (Locusta vigentissima, Serv.).
PLATE 110.—The Australian Yellow-winged Locust (Œdipoda musica, Fab. sp.).

DECADE XII.

PLATE 111.—The Blood-sucker (Grammatophora muricata, Shaw, sp.).
PLATE 112.—The Southern Chimæra (Callorhynchus antarcticus, Lacép. sp.).
PLATE 113.—The Port Jackson Shark, or Bull-dog Shark (Heterodontus Phillipi, Lacép. sp.).
PLATE 114.—The Australian Rough Fish (Trachichthys Australis, Shaw).
PLATE 115.—The Skip-jack Pike (Lanioperca mordax, Günth.).
PLATE 116.—Beania mirabilis (Johnst.).—Mucronella tricuspis (Hincks).—M. lævis (P. McG.).—M. vultur (Hincks).—Cyclicopora longipora (P. McG.).
PLATE 117.—Beania decumbens (P. McG.). — B. costata (Busk sp.). — B. Crotali (Busk sp.). — B. radicifera (Hincks sp.).—Amphiblestrum patellarium (Moll sp.).
PLATE 118.—Hornera foliacea (P. McG.).—H. robusta (P. McG.).
PLATE 119.—The Smaller Green Gum-tree Grasshopper (Phaneroptera valida, Walk.).
PLATE 120.—The Thirty-two Spotted Grasshopper (Phaneroptera [Ephippitytha] trigintiduoguttata, Serv.).

CONTENTS OF DECADE XII.

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PLATE 111.—The Blood-sucker (Grammatophora muricata, Shaw, sp.).

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Natural History of Victoria.

PRODROMUS

OF THE

ZOOLOGY OF VICTORIA;

OR,

FIGURES AND DESCRIPTIONS OF THE LIVING SPECIES OF ALL CLASSES

OF THE

VICTORIAN INDIGENOUS ANIMALS.

DECADE XIII.

BY

FREDERICK McCOY, F.R.S.,

HONORARY MEMBER OF THE CAMBRIDGE PHILOSOPHICAL SOCIETY; HONORARY ACTIVE MEMBER OF THE IMPERIAL SOCIETY OF NATURALISTS OF MOSCOW; CORRESPONDING MEMBER OF THE ZOOLOGICAL SOCIETY OF LONDON; HONORARY MEMBER OF THE ROYAL SOCIETY OF NEW SOUTH WALES; HONORARY FELLOW OF THE GEOLOGICAL SOCIETY OF EDINBURGH; HONORARY MEMBER OF THE GEOLOGICAL SOCIETY OF MANCHESTER, ETC., ETC., ETC.

AUTHOR OF "SYNOPSIS OF THE CARBONIFEROUS LIMESTONE FOSSILS OF IRELAND;" "SYNOPSIS OF THE SILURIAN FOSSILS OF IRELAND;" "CONTRIBUTIONS TO BRITISH PALÆONTOLOGY;" ONE OF THE AUTHORS OF SEDGWICK AND McCOY'S "BRITISH PALÆOZOIC ROCKS AND FOSSILS;" "PRODROMUS OF THE PALÆONTOLOGY OF VICTORIA," ETC.

PROFESSOR OF NATURAL SCIENCE IN THE MELBOURNE UNIVERSITY.

GOVERNMENT PALÆONTOLOGIST, AND DIRECTOR OF THE NATIONAL MUSEUM OF MELBOURNE, ETC.

MELBOURNE:

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M DCCC LXXXVI.

ADVERTISEMENT.

It having been considered desirable to ascertain accurately the natural productions of the Colony of Victoria, and to publish works descriptive of them, on the plan of those issued by the Governments of the different States of America, investigations were undertaken, by order of the Victorian Government, to determine the Geology, Botany, and Zoology of the Colony, to form collections illustrative of each for the public use, and to make the necessary preparations for such systematic publications on the subject as might be useful and interesting to the general public, and contribute to the advancement of science.

As the geological and botanical investigations have already approached completion, and their publication is far advanced, it has been decided now to commence the publication of the third branch completing the subject, namely, that of the Zoology or indigenous members of the different classes of the animal kingdom.

The Fauna not being so well known as the Flora, it was a necessary preliminary to the publication to have a large number of drawings made, as opportunity arose, from the living or fresh examples of many species of reptiles, fish, and the lower animals, which lose their natural appearance shortly after death, and the true characters of many of which were consequently as yet unknown, as they had only been described from preserved specimens. A Prodromus, or preliminary issue, in the form of Decades, or numbers of ten plates, each with its complete descriptive letterpress, will be published, of such illustrations as are ready, without systematic order or waiting for the completion of any one branch. The many good observers in the country will thus have the means of accurately identifying various natural objects, their observations on which, if recorded and sent to the National Museum, where the originals of all the figures and descriptions are preserved, will be duly acknowledged, and will materially help in the preparation of the final systematic volume to be published for each class when it approaches completion.

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M DCCC LXXXVI.

The fifth plate gives the natural colors, for the first time, of another Leather-jacket, the most common on our shores, the *M. hippocrepis*. These Leather-jackets are almost universally shunned by the natives and fishermen as extremely poisonous; while, in reality, they are excellent food for the table and perfectly wholesome.

The three following plates illustrate a further instalment of the magnificent collection of Polyzoa made by Mr. MacGillivray, who has presented the specimens to our National Museum and the descriptions to this work.

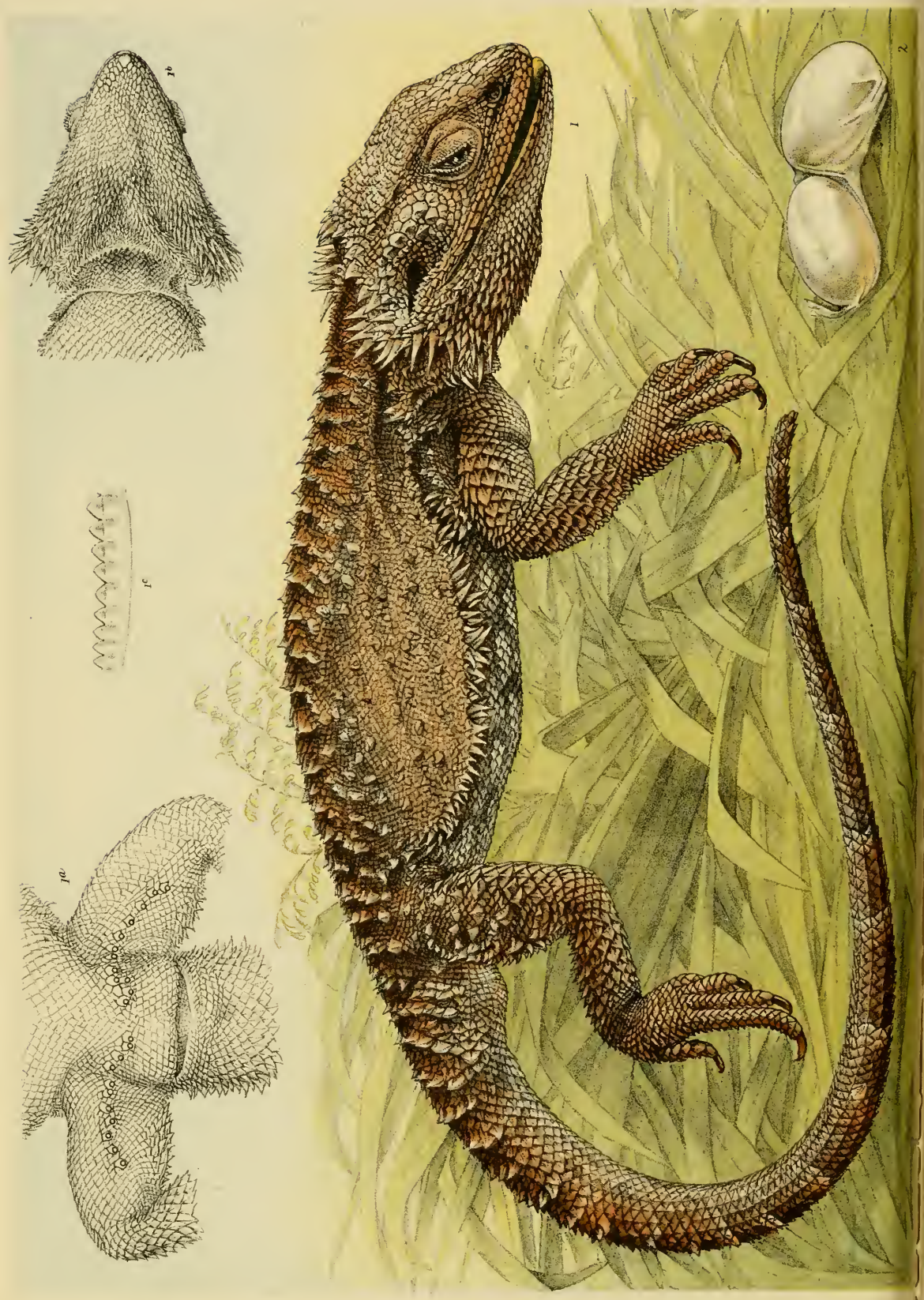
The next plate, No. 129, shows the males and curiously abnormal, apterous female of the most aberrant genus of the *Gryllidæ*, the *Acripeza*.

The last plate figures the male, female, and details, for the first time, of the largest of our carnivorous *Orthoptera*, the *Mantis latistylus*.

The succeeding Decades will illustrate as many different genera as possible, and will deal first, usually, with species of some special interest, and of which good figures do not exist or are not easily accessible.

FREDERICK McCOY.

13th September, 1886.


1b
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2

PLATE 121.

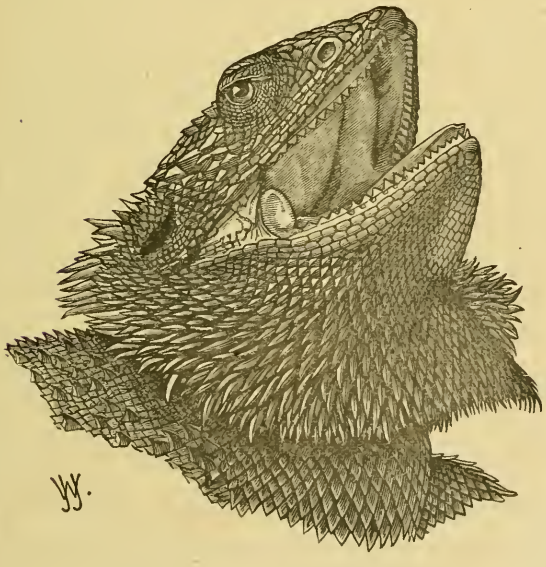
GRAMMATOPHORA BARBATA (KAUP).

BEARDED LIZARD.

[Genus GRAMMATOPHORA* (KAUP). (Sub-kingd. Vertebrata. Class Reptilia. Order Sauria: Sub-order Pachyglossæ. Tribe Strobilosaura. Fam. Agamidæ.)

Gen. Char.—Body moderate, subtrigonal or slightly depressed in section. Head large, trigonal, depressed, obtusely pointed in front; sides flattened, and separated from the top by an angle; covered with small, irregular, unequal, keeled, scale-like plates. Nostrils lateral, under angle, a little behind tip of snout. Ear-drum large, rounded. Tongue short, flat, narrow, spongy, notched at tip. Teeth short, semi-oval, compressed, on edge of jaw-bone; 5 incisors in middle, and 2 canines on each side above; 4 incisors below. Throat not pouched, with a strong, transverse fold between its base and front of thorax. Scales of back imbricated, unequal. Femoral and preanal pores large, numerous. Tail long, conical, tapering, depressed at base, with keeled imbricated scales. Toes slender, the first four gradually increasing in length, the fifth a little shorter than the second; subdigital scales keeled very strongly. Australia.]

DESCRIPTION.—Body broad, depressed; head large, swollen at the sides behind. Nostrils halfway between tip of snout and anterior edge of orbit. Top of head nearly flat, with a distinct angular ridge from tip of snout over the eyebrow, separating it from the concave side to edge of lip; the space over the eyes only slightly convex. Ear-drum oval in young, subtrigonal in old, without denticles or lobes on edge. *Scales:* Smaller and more numerous scales of all parts of the surface rhomboidal, with a strong, longitudinal, median keel ending in a point on the hind edge, and with two or three indistinct, lateral keels; mixed with these are trihedral, thorn-like, spinose scales, two or three times larger at base than the others, and rising to a conical point in the middle, with radiating, wrinkled base; a longitudinal ridge of 4 or 5 large, compressed conical spines over each ear, connected by a transverse row of 8 or 10 rather smaller ones across the back of the head; a large, dense, beard-like group of very long, slender, pointed, spinous scales,



Head, natural size, to show form of beard.

* I continue to use this generic name instead of *Amphibolurus* for reason mentioned in note to Plate 111.

arched backwards, and extending along the sides of the parotoids behind the ear, not extending quite across the back of neck; along each side from over the shoulder is a row of very long, sharp, backward-arched spines, like those of the beard; back without median, longitudinal ridge, but with numerous conical spines, shorter than those of the flanks or beard, and more upright on the base, irregularly arranged in bands extending obliquely backwards and outwards; similar spinose scales form several irregular, transverse rows on basal portions of tail with rhomboidal scales, larger than the small ones of the back, each with a very strong median keel forming continuous longitudinal ridges; upper surface of arms and thighs rough, with large spinous scales; a transverse group of spinous scales over the shoulder; belly with smooth and more uniformly regular rhomboidal scales, less strongly keeled longitudinally. Legs and toes short; hind limb reaching to shoulder if drawn up. Femoral pores about 7 to 9 on each thigh, forming an irregular line continued from side to side by 8 to 10 preanal pores. Tail round, depressed at base, nearly twice as long as head and body. *Color:* Sordid brownish-grey above, with the transverse rows of spines lighter, forming narrow, irregular, transverse, indistinct lighter bands; tail crossed by a variable number of narrow, light bands, 1 or 2 scales wide, separated by darker spaces, 6 or 7 scales wide; arms and legs also with narrow, irregular, variable, lighter bands; a blackish spot on side of neck from behind ear; belly lighter and more uniform, with large, oval, lighter yellowish spots with dark brown, narrow, irregular, imperfect margins; claws yellow on sides, dark above; inside of mouth and tongue yellow; iris dark brown. Dimensions of moderate specimen:—Total length, 1 ft. 5½ ins.; length of head, 2 ins.; width of head, 2 ins. 3 lines; tip of snout to base of tail, 9 ins.; tip of snout to nostril, 5 lines; tip of snout to anterior edge of orbit, 9 lines; tip of snout to ear, 1 in. 9 lines; arm, 1 in. 4 lines; fore-arm, 1 in.; free part of longest toe, 8 lines; thigh, 1 in. 6 lines; leg, 1 in. 3 lines; free part of longest hind toe, 8 lines.

Reference.—Kaup, Isis, 1827, p. 621; Gray, Zool. E. and T. Rept. t. 18, f. 1 (young).

This is commonly called the Jew Lizard by colonists, and is easily distinguished by the beard-like growth of long, slender spines round the throat and parotoids, the form of which below, in the adult, is shown in the woodcut, and the similar band along the sides, as well as by the absence of any median keel along the back. Some specimens have the throat black.

When irritated, it inflates the body to a considerably increased size, and hisses like a snake, exciting alarm; but rarely biting. The eggs are usually 8 or 10, connected by membrane in a row.

I observe great difference in the acuteness or flatness of the plates of the head and of the large thorn-like scales of the body in different specimens, and the relative size of the rostral and mental plates at tip of snout. The throat has very generally a broad, black, transverse band where the beard-like scales grow, but this is sometimes absent. A few specimens have the belly pale and

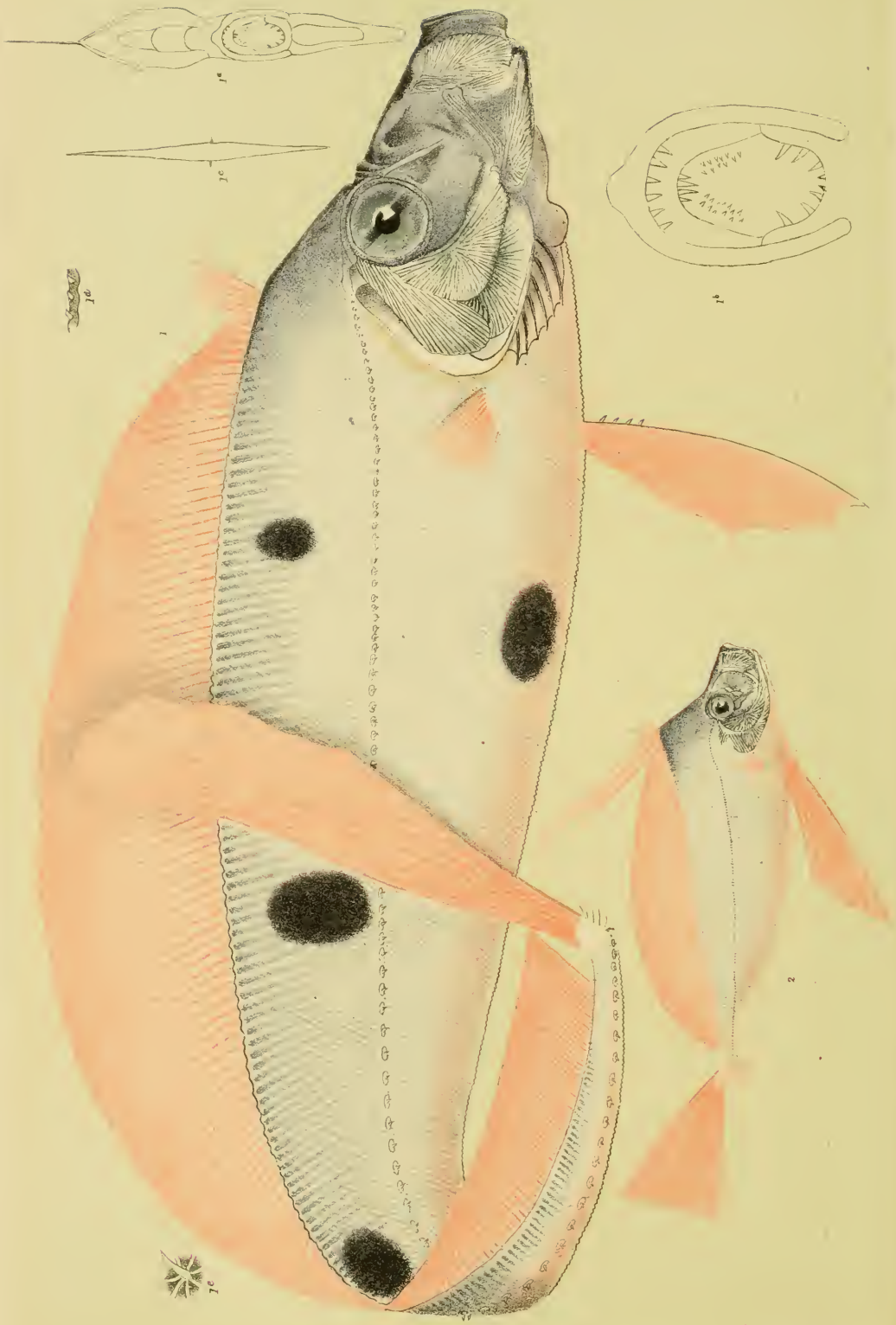
uniform in color, but this is very unusual. Young specimens, 5 or 6 inches long, have the top of the head over the eyes more convex than the adults, and the coloring much brighter, being rich brown above, with the transverse narrow pale bands much more distinct, about 7 of them on body, 15 on tail, 3 on thigh, and 1 or 2 on arm; the broad streak from the eye through the ear, and the continuation of it which forms the usual dark mark on side of neck very dark rich brown; the broad, transverse, V-shaped band on throat of an inky blackness. In these young the spinose beard is very much smaller, and there are two rows of large (5 or 6) rhombic spots lighter than the general brown of the back, the midline of which shows like a dark series of rhomboidal spots, approaching to the markings of *G. muricata*, from which the absence of any median dorsal keel and the other characters enumerated above easily distinguish it.

This species is rare near Melbourne, but becomes gradually more abundant in all the more northern warm localities up to the Murray boundary.

Explanation of Figures.

Plate 121.—Fig. 1, side view of moderate specimen, natural size. Fig. 1*a*, under-side of thighs, to show the femoral pores. Fig. 1*b*, under-side of head, two-thirds natural size, to show the transverse fold and the under part of the beard. Fig. 1*c*, edge of jaw, with molar teeth enlarged. Fig. 2, a couple of the strings of eggs, natural size.

Frederick McCoy.



A. Bartholomew del et lith. Prof. McCoy direct. Steam Litho. Govt. Printing Office

PLATE 122.

TRACHYPTERUS TŒNIA (BLOCH).

THE SOUTHERN SILVER RIBBON-FISH.

[Genus TRACHYPTERUS (GOUAN). (Sub-kingd. Vertebrata. Class Pisces. Sub-class Teleostea. Order Acanthopterygii. Fam. Trachypteridæ.)

Gen. Char.—Body very long, tapering gradually from the head to the tail; excessively compressed laterally to a thin band; no scales; eyes large, lateral; muzzle truncated, protractile; mouth small. Teeth few, small, conical, on jaw and palatine bones; one large dorsal fin of delicate, simple rays (not jointed nor branched), extending from head to base of tail, with small, semi-detached anterior portion of few elongated rays; caudal not in line of body, inclined obliquely upwards and backwards, of long, slender, branched rays; no anal; pectoral very small, rounded; ventrals large, of 5 or 6 branched rays, nearly under base of pectoral. Bones of head, preoperculum, operculum, and suboperculum radiatingly ridged; few conical teeth on jaws and vomer, and a patch of smaller ones on each palatine bone; branchiostegal rays, 6; large pseudobranchiæ in a pouch of mucous membrane. Pyloric appendages very numerous. No swim-bladder. Surface silvery, with fine transverse granulations. Bones of skeleton and muscles soft and brittle. Deep sea.]

DESCRIPTION.—Greatest depth of body a little behind the head, and one-fourth more than length of head with jaws retracted, and is contained $5\frac{3}{4}$ times in the total length, excluding caudal fin. Six conical teeth in front of upper jaw, and 8 in lower one; 4 smaller on vomer, and 2 oblong patches of very small, numerous teeth on each palatine bone. Eye about one-fourth the length of head, a little behind the middle and close to upper margin. Interoperculum nearly as large as operculum, suboperculum small, triangular, all the bones of the head radiatingly ridged; gill-opening reaching to vertical under middle of eye. *Fins:* First 5 rays of dorsal more elongated than following rays of continuous dorsal, from which it is also separated by a marked space of membrane; hinder portion of dorsal of about 170 rays, rapidly increasing to its greatest depth at about the 20th ray, where its height equals about half the depth of the body; the rays rough and granular, with a small spinous tubercle at base of each; caudal having an upper portion of about 6 or 8 very long branching rays directed obliquely upwards and a little backwards; and a lower portion of 6 short rays directed backwards; pectorals very short, rounded, of about 10 rays; ventrals about equalling the depth of the body, of 5 to 7 branched rays, the first one with a row of spinular granules on front. Lateral line of a row of conical spines, stellate at base, extending from upper edge of operculum to join that of other side below and in front of caudal, where a spine marks the junction of the two lateral lines, with a point directed forwards and another hooked backwards; a double row of small tubercles along ventral edge. Vent a little in front of middle of length. *Color:* Whole surface bright silvery; greyish-lavender on nape and head, and with transverse grey lines corresponding with neural spines of vertebræ; 2 spots on top of head, an oblique band across eye, and 3 large, rounded spots above lateral line; the 1st about one-third the length from snout, the 2nd a little in front of middle, the 3rd spot about half way between second one and tail, nearly black; and one oval paler one near abdominal edge behind the vertical of 1st upper spot; belly and behind gill-opening faintly tinged with brown; rest of surface rendered finely granular by very fine, close, transverse lines extending obliquely downwards and backwards from the back; fins rosy-scarlet, membrane paler than the rays. *Measurements:* Length, 10 ins. 3 lines; head, 1 in. 10 lines when snout retracted, 2 ins. 3 lines when protruded; greatest depth of body, 2 ins.; diameter of orbit, 6 lines, 6 lines in advance of hind edge of operculum,

distance from snout varying with protrusion of jaws; greatest thickness of body, about 2 lines (figured specimen). Second specimen—Length, 1 ft. 4 ins. 6 lines; greatest depth of body, 2 ins. 6 lines; length of head (half protruded), 2 ins. 3 lines; height of middle of posterior dorsal, 1 in. 9 lines.

REFERENCE.— = (Bloch and Sch.), p. 480 = *T. falx* (Cuvier and Val.), Hist. Pois. v. 10, p. 333; = ? *T. iris* (Cuv. and Val.), id. p. 341, t. 297.

The fishes of this genus resemble silver ribands or bright sword-blades, from their narrow, tapering, greatly compressed bodies, and the glistening silver lustre of the nearly smooth, scaleless surface. They are less known than those perhaps of any other genus, on account not merely of their rarity, but from their inhabiting the profound depths of the ocean, whence they rarely emerge, and where they are not exposed to the rough motions of shallower waters, in which they are quickly battered to pieces. The whole structure is so frail, brittle, and delicate, and so easily and quickly decomposed, that it is extremely difficult for observers to describe them; and I feel convinced that several of the described species are really only differently observed individuals of one or two species. Thus the relative length of the rays of the anterior portion of the dorsal fin, the caudal fin, and the ventral fins in different individuals is due to the excessive delicacy and fragility of the rays—as fine as the finest hair, and as brittle as spun glass—so that the slightest touch in separating the rays to count them breaks them in pieces. I think also that the young are deeper and shorter in proportion than the old; and, consequently, the specific differences founded on the greater number of times the length of the head or the depth of the body are contained in the total length are not to be trusted for specific characters when the length of the specimens is different. I also believe the numbers of rays in the dorsal fin increase with the length of the body of the individual. I notice that Cuvier and other observers of actual specimens invariably describe the largest specimen as, proportionally, the longest and most slender, and with the length of head or depth of body forming the least proportion of the total length, while small specimens, an inch or two long, are more ovate, with the head and the depth going fewer times in the total length. I therefore think it very likely that the *T. Spinolæ* of Cuvier may be the young of his *T. falx*, and *T. iris*, and *T. tænia*, to which I refer our Victorian species. The smaller

specimen figured of the natural size on our plate (Fig. 2) is probably the young of the larger and more typical example (Fig. 1), the anterior portion of the dorsal of which latter, I have no doubt, has lost the greater part of the length shown in the young, merely from accidental causes, owing to its fragility. The greater number of rays in the continuous dorsal in the larger than in the smaller specimen, I believe, follows the general rule mentioned as probably holding good for these fishes, although not for those families and genera with fewer rays.

The first specimen which reached the Museum was presented by Mr. Hy. Dusting, from Portland, caught in April 1879. A second, from my excellent friend, Mr. Henry Butler, of Portland, who has contributed a great number of rare fish and other marine objects to the Museum, somewhat smaller but more perfect than the first, is the example figured, and both specimens agree exactly in coloring and other details.

The third specimen, also figured, is another of Mr. Butler's donations, and is much smaller—only 2 ins. 7 lines long, without caudal fin—but more perfect, especially in the long anterior part of the dorsal. In this specimen the depth is contained only $3\frac{1}{2}$ times in the total length, excluding caudal fin. This, I believe, like Cuvier's *T. Spinolæ*, to be the young of the proportionately longer, larger specimen; although, in this case, unlike *T. Spinolæ*, the large, rounded, black spots are wanting.

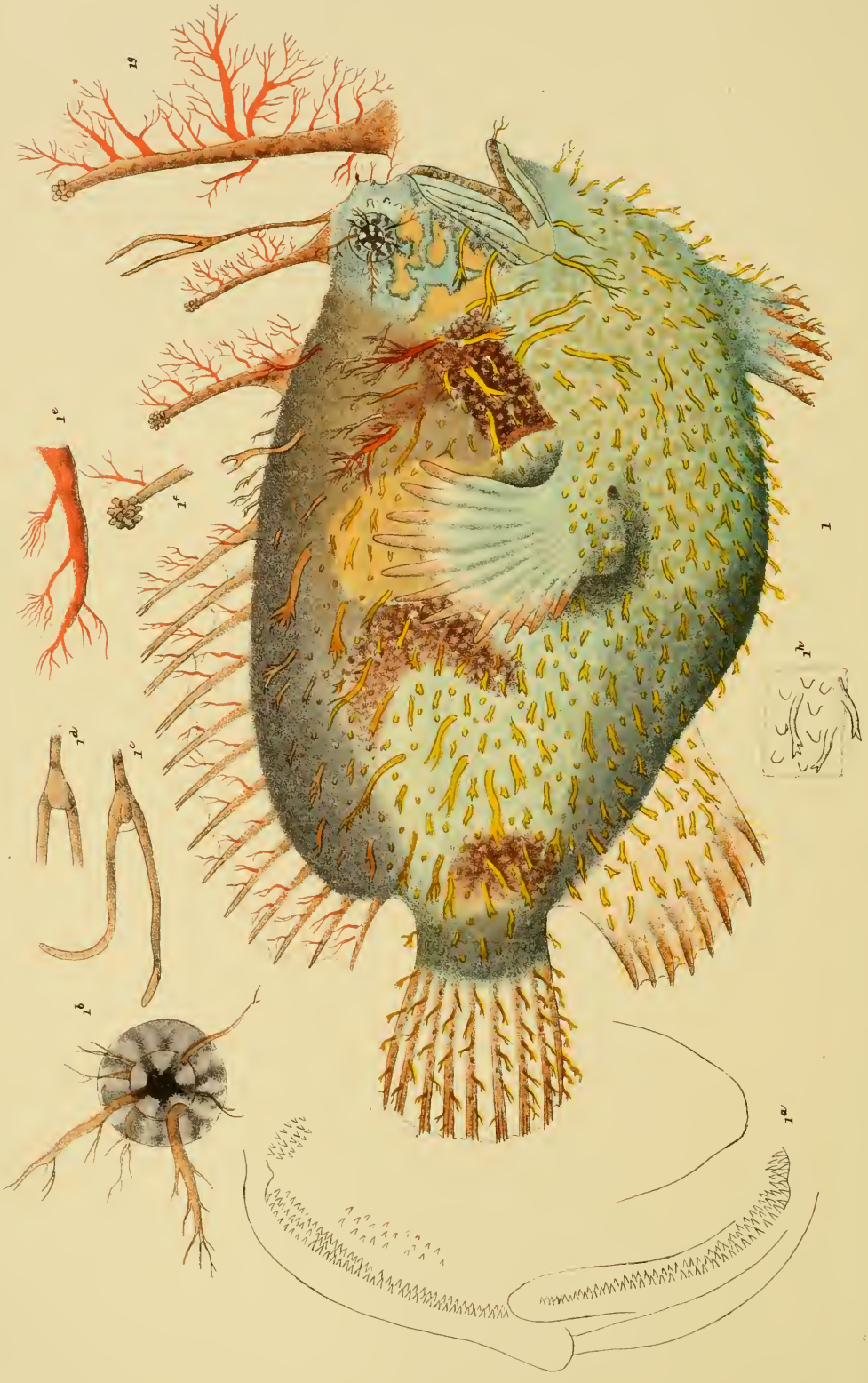
The curious silvery glitter of the surface seems slightly granular and disposed in very fine, oblique, transverse lines extending from above downwards and backwards from the dorsal to the ventral edge, and passing over the black blotches, from which it may be peeled off when decomposition sets in.

The mouth is so protractile that in taking the length of the head, compared with other parts, as a character, it is necessary to state whether it is extended or retracted.

Explanation of Figures.

Plate 122.—Fig. 1, average specimen, natural size. Fig. 1*a*, front view of head, natural size. Fig. 1*b*, mouth showing the teeth on jaws, vomer, and palatine bones, magnified three diameters. Fig. 1*c*, section of body, to show compression. Fig. 1*d*, three spines from lateral line, magnified three diameters. Fig. 1*e*, one spine of lateral line, magnified five diameters, to show radiated base. Fig. 2, young specimen, natural size, probably of same species.

Frederick McCoy.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1e
1f
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1h
1d
1c
1b
1a

PLATE 123.

CHIRONECTES BIFURCATUS (McCOY).

THE TWO-PRONGED TOAD-FISH.

[Genus CHIRONECTES (CUV.) > ANTENNARIUS* (COMM.). (Sub-kingd. Vertebrata. Class Pisces. Sub-class Teleostea. Order Acanthopterygia. Fam. Pediculati.)

Gen. Char.—Of moderate size, and compressed, ovate form; head moderate, compressed laterally. Three anterior dorsal rays, separate, and in front of dorsal fin, which has no other spines; the 1st ray forming a flexible tentacle over the snout; the 2nd and 3rd are stout spines. Mouth nearly vertical when closed. Jaws and palatine bones set with many rows of small, cardiform teeth. Tongue smooth. Aperture behind the four gills very small, oval, placed on pedicle of pectoral fin. Eyes near snout and top of head; opercular pieces covered by the skin; only half of anterior branchial arch with gills; no pseudo branchiæ. Stomach wide; no pyloric appendages; an air-bladder. Soft dorsal longer than anal fin. Pectorals pedunculated by elongation of carpal bones.]

DESCRIPTION.—Broad, ovate, moderately compressed; depth half the length to end of caudal, and twice the thickness; head compressed, profile descending obliquely from nape; mouth nearly vertical. First dorsal spine or filament with a slender, cylindrical stem, three-fourths the length of second spine, surmounted by a thickened portion divided into two thick, equal, cylindrical, tapering branches, and two short, flat, lateral flaps; second ray thick, bony, terminating in 5 blunt tubercles, and having numerous long, branching filaments on its anterior face; third spine like the second, but terminating in 8 or 10 soft tubercles, and with a slight, membranous extension from back of lower third of base, and with numerous, branching filaments from front face, far larger than those of second; dorsal fin of 13 thick soft rays (two last with one base), projecting about one-fourth beyond membrane, and with numerous, branching filaments from sides; caudal fin with 9 rays, set with branching filaments; anal fin with fleshy base and 8 or 7 rays set with few branching filaments; pectoral of 11 thick rays, set with very short, branching filaments on upper surface; ventrals with 5 thick rays, with few, very short, branched filaments on upper side; whole surface of body set with filaments bi- or tri-fid at end, 6 or 7 lines long on back, about 2 lines long on belly, longest on sides of head, throat, and lips; 2 very large and 3 smaller above the eye, and 2 smaller below it; skin smooth, or with blunt, conical tubercles between the filaments. *Color:* Whole body mottled with olive, pale yellow and light green, and with several large, irregular clouds of very dark brown, largest one over base of pectoral, next half way to base of tail, where a third conspicuous one usually appears; inside of mouth and tongue pale green, with opaque, pearly-white, cloudy spots; all the filaments orange; no spots on fin rays; eye with radiating bands of pale and dark green; anterior dorsal ray with the basal filament transversely banded with brown.

* As Commerson's name, *Antennarius*, was not published, but only written on his drawing, it is more according to rule to adopt the name *Chironectes*, published for fishes of the genus by Cuvier.

MEASUREMENTS.

	Ins.	lines.
Total length from snout to end of caudal	6	5
„ of head	1	6
Depth of head	1	7
Width of head	1	0
Length of stem of first ray	0	11
„ „ broad base of branches	0	2
„ „ each of two long branches	0	8
„ „ second ray	1	1
„ „ third ray	0	9
„ „ space between first and second rays	0	1½
„ „ „ second and third ray	0	11
„ „ „ third ray and first dorsal fin ray ...	1	0
„ from mouth to anterior base of pectoral	2	5
Depth of body	3	0
Thickness of body	1	5
Length of dorsal fin	2	4
Greatest height of dorsal fin	1	0
„ „ „ anal fin	1	3
Greatest depth	1	0
Length of caudal	1	0
Length of longest pectoral rays	1	2
Length of ventral fin	0	7
Greatest depth	0	7

Of three specimens before me the only difference is one spine more or less in the anal fin, and in the greater or less number of the large, brown blotches on the body; the two-pronged, first, long ray with the two, short, lateral flaps at bases of the two prongs at tip of basal filament, being alike in all.

There can be no doubt of the first filament bearing two long, thick, nearly equal branches or filaments at extremity, and this character allies it to *Antennarius histrio* and *A. tigris* only, of all those described by Dr. Günther and the *L. marmoratus* of Shaw, which latter need not be considered. From *C. histrio*, which it also resembles in the colored rays from the eye, it differs in the straight 2nd and 3rd dorsal rays, and their not being connected with skin of midline of back, except at base, and in the unspotted fins, and in the skin being smooth, instead of rough with small spines. *A. tigris* differs in having the 3rd dorsal ray connected to the soft dorsal by a wide skin, its rough spinular surface and the last ray of soft dorsal not reaching, if laid back, as far as base of caudal, and also in the spotted fins. None of the other species described by Cuvier, the French Voyagers, Richardson, Count Castelnau, Dr. Bleeker, or Dr. Günther, resemble this species at all, and it is the only species of the genus I have as yet met with on our shores.

These beautiful and curious fishes are found occasionally after strong south winds on the Brighton shore in summer in the shallow pools in the rocks. They are very soft and extensible, blowing themselves up like a balloon, as the *Diodon* does, when alarmed. The pedunculated pectoral and ventral fins look to the popular observer like fore feet or legs, and are used like them for moving amongst sea-weed, in which they crawl like toads; the very small gill-aperture, opening on the arm-pit of the pectoral fins, keeping the gills moist for so long a time that they seem almost amphibious in the habit of moving about out of the water between the tides.

This species has not been figured before.

Explanation of Figures.

Plate 123.—Fig. 1, side view of average specimen, natural size. Fig. 1*a*, magnified view of mouth, to show rows of minute teeth on jaws and palatine bones. Fig. 1*b*, eye, magnified, to show radiating arrangement of color and form of tentacles. Fig. 1*c*, bifurcate anterior filament, magnified, showing the small, middle lobe on anterior aspect. Fig. 1*d*, ditto, seen from behind, to show the larger, posterior median lobe. Fig. 1*e*, tentacle, magnified. Fig. 1*f*, top of third dorsal spine, magnified, to show form of cluster of tubercles. Fig. 1*g*, second dorsal spine, magnified, to show tubercular tip and branching filaments. Fig. 1*h*, filaments and tubercules of ventral surface.

Frederick McCoy.

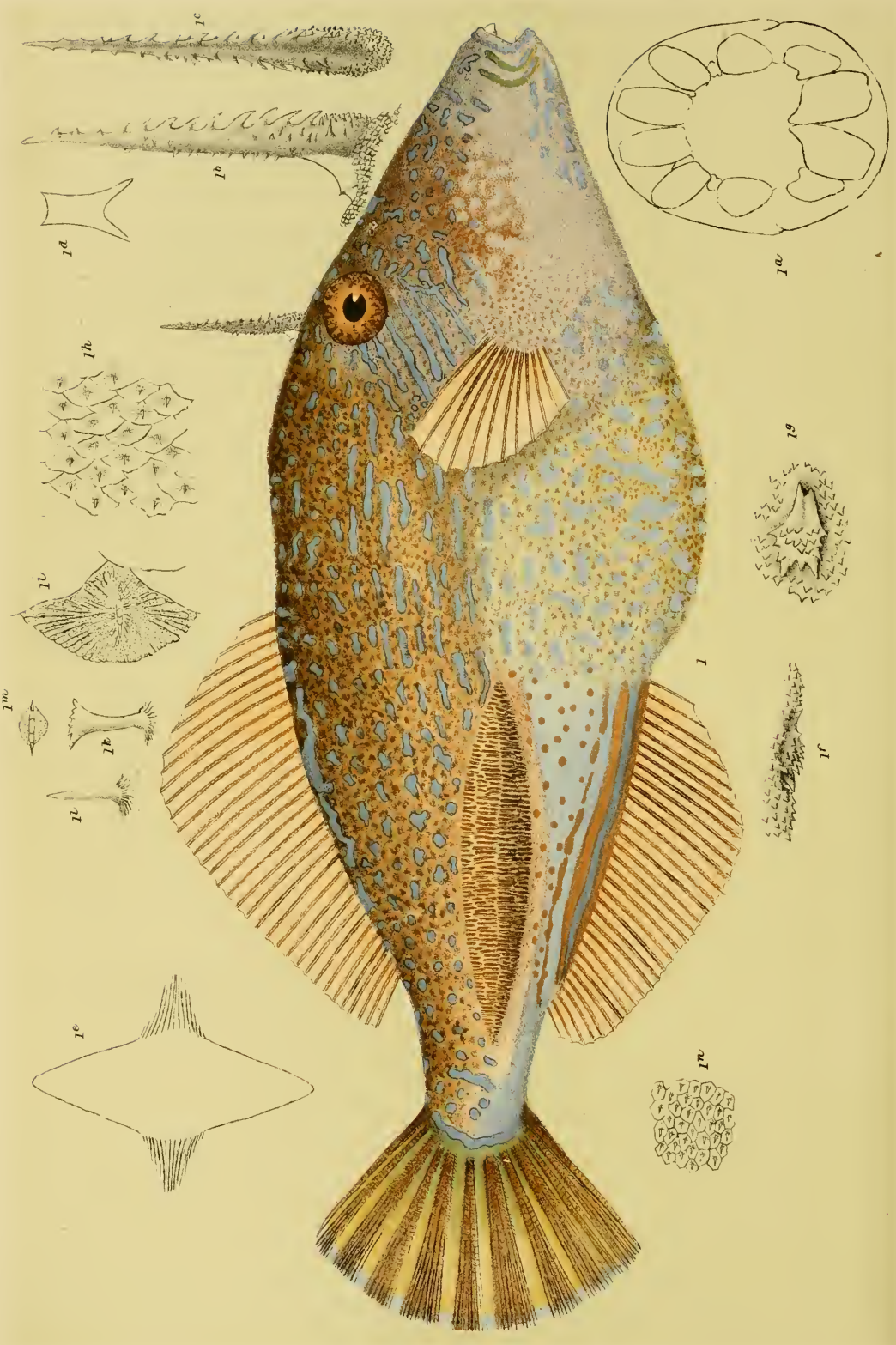
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PLATE 124.

MONACANTHUS BROWNI (RICH. SP.)

BROWN'S TOOTH-BRUSH LEATHER-JACKET.

[Genus MONACANTHUS (CUV.) + ALUTERIUS (CUV.) (Sub-kingd. Vertebrata. Class Pisces. Sub-class Teleostea. Order Plectognathi. Fam. Sclerodermi.)

Gen. Char.—Body compressed, elevated in the middle; scales small, rhombic, distinct on inner surface of skin, obscured by minute spines roughening the outer surface; sides of tail with 4 or 6 hooked spines in 2 or 3 rows, smaller or absent in females. Lateral line absent or indistinct. *Teeth:* 6 broad, flat, sharp-edged incisors in outer row of each jaw, and 4 forming an inner row in upper jaw, alternating, one between the 1st and 2nd, and the other between the 2nd and 3rd, on each side of the outer row. *Fins:* First dorsal composed of one large thick rough bony spine, which may be fixed in erect position or lowered into a pit on back, over the eye; membrane very small, triangular at base, with or without a second small, rudimentary spine; soft dorsal and anal long and low, with simple unbranched rays; pectoral small, rounded; caudal rounded; ventrals replaced by a small spine, sometimes rudimentary or absent. Branchial slit in front of base of pectoral. No barbel to chin. Tropical and subtropical seas.]

DESCRIPTION.—Body sub-fusiform, rhombic, moderately compressed, profile nearly straight, very slightly convex, rising to a little behind the first dorsal at an angle of about 25 or 30 degrees. General proportion slender, the greatest height about one-third of the total length, including the caudal fin. Eye large, close to the frontal level. Branchial slit oblique, nearly equalling the diameter of the eye, lower end just above level of base of pectoral. First dorsal spine nearly straight, irregular, slightly less than half the length from its base to the snout, placed over the posterior third of the eye, quadrangular in section, the two anterior longitudinal ridges with about 13 large, slightly hooked spines, directed obliquely downwards forwards and outwards. Two posterior keels with much fewer and smaller spines, very irregular in size, shape, and direction, most of them being directed upwards, and a few outwards or downwards; a few irregular spinous tubercles on the sides between these rows. One very small ray in the membrane behind the large spine. Abdominal edge narrow over the long pelvic bone, the point of which is scarcely traceable, but is covered with a little plate having a few large spines at its angles, and beyond which the ventral outline rises abruptly to the anterior base of the anal fin. *Fins:* Pectoral semi-oval, rounded, of 13 rays. Second dorsal rising rapidly to the 7th and 8th rays, with an obtusely rounded curve, continuing thence with a straight edge and gradually diminishing height to the posterior end, of 33 simple rays. Anal rising rapidly to the 6th or 7th ray with a rounded anterior edge, thence nearly straight to the shorter rays of posterior end, composed of 32 simple rays. Caudal fin rounded, of 14 thick, doubly-branched rays, set with spinulose granules. Skin covered with small rhombic scales, each rising into a point having a broad radiated base, in the fresh state, on some parts of the body; the apex of the spine is capped with a granular cutaneous mushroom-like expansion. On the

midline of the body, from about the vertical from the anterior margin of the anal fin to a little beyond the line of its posterior termination, a tooth-brush-like cluster of very long, slender, bristle-shaped spines, 6 or 7 wide in the middle, and as high as the 2nd anal spine, stand out perpendicular to the sides of the body, some of them straight, and others with the tips bent. *Color:* Back and upper half of sides and head rich yellowish-bronze-green as ground color, with 7 or 8 irregular, longitudinal rows of short streaks and oval spots of sapphire-blue, and very numerous intermediate dots of dark brown; 2 or 3 narrow, olive streaks round the mouth; ground color of lower half of sides and belly pale opaline-blue, mottled and dotted with the yellowish-green and brown of back, but paler, and with paler, similar, irregular blue spots and short streaks; a long, oval, dull, saffron-yellow patch extends from over front of anal fin nearly to base of caudal, from the upper portion of which arises the "tooth-brush" set of spinose filaments of the same dull yellow mottled with brown; below this yellow patch to base of anal fin the ground color is opal-purple with small, irregular, brown spots; three long, narrow, brown streaks, about their own width apart, run along over the base of anal fin, the space between the lower pair sapphire-blue; caudal fin dull pale yellowish-olive with darker brownish rays; dorsal, anal, and pectoral fins with pale, almost colorless, yellowish membrane, and darker yellowish-olive rays; anterior dorsal spine blackish-olive; iris brown. *Measurements:* Total length from snout to end of caudal, 1 foot. Proportional measurements to total length as unity: Snout to anterior edge of orbit, $\frac{24}{100}$; greatest depth of body, $\frac{35}{100}$; greatest thickness behind head, $\frac{12}{100}$; diameter of eye, $\frac{7}{100}$; height of 1st dorsal spine, $\frac{10}{100}$; distance of base from edge of upper teeth, $\frac{25}{100}$; length of branchial slit, $\frac{4}{100}$; length of pectoral, $\frac{12}{100}$; length of 2nd dorsal, $\frac{30}{100}$; greatest height of ditto, $\frac{14}{100}$; from snout to anterior ray of ditto, $\frac{50}{100}$; from snout to anterior ray of anal, $\frac{51}{100}$; length of anal, $\frac{28}{100}$; greatest height of ditto, $\frac{12}{100}$; length of caudal, $\frac{15}{100}$; height of tooth-brush spines, $\frac{8}{100}$. Number of spines in space of 3 lines about middle of body, 5.

REFERENCE.—*Aleuterius Browni*, Rich. Voy. E. and T. Fish, p. 68 = *Monacanthus lineo-guttatus*, Hollard Monog. des Balist. Ann. des Sc. Nat., 1854, Zool. v. 2, p. 352.

Those species of *Monacanthus* having a brush-like cluster of slender, bristly, elongate spines on each side of hinder part of body and tail are called "Tooth-brush Leather-jackets," from these curious developments being about the size and shape of a coarse tooth-brush. These filaments are obviously a great prolongation of the minute spines of other parts of the body. This strange character is only fully developed in old males. In the present species the dorsal and anal fins are unusually high, and the spinose teeth on the anterior ridges of the first dorsal spine unusually large. The curious mushroom-like soft, fleshy, granulated tips to the skin spines in the fresh specimens shrink so as to expose the simple sharp points with their large stellated base, when dried.

Not very uncommon in Bass's Straits. The example on our plate was obtained in blasting the rocks at the Heads.

This species has not been figured of the natural colors before. It is reputed poisonous, but many of my friends have praised it highly as a table fish, and it is certainly quite wholesome.

Explanation of Figures.

Plate 124.—Fig. 1, side view, about two-thirds natural size. Fig. 1*a*, front view of mouth, showing the teeth, twice the natural size. Fig. 1*b*, anterior spine, side view, one and a half times the natural size, showing small second spine in membrane, behind base. Fig. 1*c*, ditto, viewed in front. Fig. 1*d*, section, three times the natural size. Fig. 1*e*, section across posterior part of body to show the projection of the "tooth-brush" spines. Fig. 1*f*, side view of ventral spine, three times the natural size. Fig. 1*g*, the same, viewed from below. Fig. 1*h*, scales of the middle of body, magnified four diameters. Fig. 1*i*, one of the scales, more highly magnified, showing the top of spine without skin. Fig. 1*k*, side view of one of the spines of skin, fifteen times larger than natural size. Fig. 1*l*, front view of spine without skin, magnified. Fig. 1*m*, top view of 1*k*. Fig. 1*n*, scales from side of tail, magnified four diameters.

Frederick McCoy.

ZOOLOGY OF VICTORIA

(Fishes)

A Bartholomew del. et lith.

Prof. M.c Coy Direct.r

Steam Litho. Govt. Printing Office

PLATE 125.

MONACANTHUS HIPPOCREPIS (QUOY AND GAIM. SP.).

THE HORSE-SHOE-MARKED LEATHER-JACKET.

[Genus MONACANTHUS (CUV.) + ALUTERIUS (CUV.). (Sub-kingd. Vertebrata. Class Pisces. Sub-class Teleostei. Order Plectognathi. Fam. Sclerodermi.)

Gen. Char.—Body compressed, elevated in the middle. Scales small, rhombic, distinct on inner surface of skin, obscured by minute spines roughening the outer surface; sides of tail with 4 or 6 hooked spines in 2 or 3 rows, smaller or absent in females. Lateral line absent or indistinct. *Teeth:* 6 broad, flat, sharp-edged incisors in outer row of each jaw, and 4, forming an inner row, in upper jaw, alternating, one between the 1st and 2nd, and the other between the 2nd and 3rd, on each side of the outer row. *Fins:* First dorsal composed of one large, thick, rough, bony spine, which may be fixed in erect position or lowered into a pit on back, over the eye; membrane very small, triangular at base, with or without a second small, rudimentary spine. Soft dorsal and anal long and low, with simple unbranched rays. Pectoral small, rounded. Caudal rounded. Ventrals replaced by a small spine, sometimes rudimentary or absent. Branchial slit in front of base of pectoral. No barbel to chin. Tropical and sub-tropical seas.]

DESCRIPTION.—Body sub-fusiform, compressed, profile nearly straight, rising at an angle of about 30° from the longitudinal lateral midline to a little behind first dorsal, thence slightly concave to origin of second dorsal, the dorsal line beyond this being nearly straight to the base of the caudal. Greatest depth of body about one-third of the length, including the caudal fin. Eye large, close to the frontal level. Branchial slit oblique, nearly twice the length of the diameter of the eye; lower end a little below middle of base of pectoral. First dorsal spine straight, irregular, slightly less than half the length from its base to the snout, placed over the posterior third of the eye; section convex in front, angular, nearly flat behind; lateral edges with a row of about 20 very small spines, irregular in size, shape, and direction, some extending upwards, others downwards and outwards; anterior face covered with minute, rounded granules having a tendency to run into flexuous longitudinal lines, the two middle anterior rows much larger than the others, slightly spinose in some specimens towards the apex; second ray absent in most specimens. Ventral spine at end of pelvic ridge scarcely perceptible, covered with a very small, spinulose, oblong plate. Pectoral broad, rounded, of 13 rays. Second dorsal low, rising rapidly to the fifth ray, thence continuing with little diminution to near the end, of 35 simple rays. Anal about as high as the second dorsal, the first ray shorter than the succeeding ones, which diminish slightly till near the end, of 32 or 33 simple rays. Caudal fin sub-truncate, slightly convex, of 12 thick, doubly-branched rays, set with small spinulose granules. Skin with small rhombic scales, with fine granules, and a line of from 3 to 7 larger, thicker, sharp-pointed spines, inclined backwards on each; 4 very much larger, conical spines on each side of the base of the tail, inclining backwards in female, forwards in male. *Color:* Head, cheeks, and portion of back yellowish-olive, darkest on sides of head; belly lighter olive as far as anal fin; from tip of pectoral to about end of anal fin a broad, deep chrome-yellow, ovate patch, having a black horse-shoe-shaped mark

on its anterior half, enclosing an oblong dark grey patch; posterior part of back, belly, and base of tail dark grey; 3 bright ultramarine-blue stripes surround the mouth, with a dull yellow one behind each; 3 or 4 long, flexuous, narrow stripes of bright blue extend from the throat along the belly, the two lowest joining from one side to the other, one in front and one behind the vent, the next lower one at the base of the anal fin; the upper one continued in a loop at the base of the caudal, and extending thence a little below the dorsal margin, nearly to the base of the anterior dorsal spine, with a dull yellow streak below it on the middle of the back, and two rows of numerous blue spots above it, and 2 or 3 rows of dark-purplish spots below, between it and the middle yellow patch; 2 or 3 short blue streaks radiate from the eye in front. All the fins with nearly colorless membrane and sap-green rays, with a bluer tinge on the caudal; caudal fin with a broad semilunar black band from the upper to the lower angle; a narrower band along the upper and the lower edge, and a narrower band of black at the base. Iris bronze-yellow. *Measurements:* Total length from snout to end of caudal, 1 ft. 1 in. 6 lines. Proportional measurements to total length as unity: Snout to anterior end of orbit, $\frac{19}{100}$; greatest depth of body, $\frac{33}{100}$; greatest thickness behind head, $\frac{13}{100}$; diameter of eye, $\frac{4\frac{1}{2}}{100}$; height of 1st dorsal spine, $\frac{10}{100}$; distance of base from edge of upper teeth, $\frac{2\frac{5}{2}}{100}$; length of branchial slit, $\frac{8\frac{1}{2}}{100}$; length of pectoral, $\frac{7}{100}$; length of 2nd dorsal, $\frac{2\frac{9}{2}}{100}$; greatest height of ditto, $\frac{7}{100}$; from snout to anterior ray of ditto, $\frac{4\frac{2}{2}}{100}$; from snout to anterior ray of anal, $\frac{5\frac{4}{2}}{100}$; length of anal, $\frac{2\frac{3}{2}}{100}$; greatest height of anal, $\frac{7}{100}$; length of caudal, $\frac{10}{100}$. Number of scales in space of 3 lines about middle of body, 8.

Reference.— = *Balistes hippocrepis*, Quoy and Gaim., Voy. Uran. Zool., p. 212; = *Aluterius variabilis*, Rich. Voy. E. and T. Fish, p. 67, t. 53, f. 1 to 7.

The "Leather-jackets," as the species of *Monacanthus* are popularly called, are numerous in Australia, and are remarkable for the varied character of the small roughnesses which cover the skin outside, obscuring the scales, which are, however, distinctly visible on the inner side; these roughnesses are sometimes pointed spines, or with variously bent or dilated tips. The spine of which the first dorsal fin is mainly composed, when raised is fixed in that position immovably by a short, thick, bony piece falling under a notch in its base; the spine cannot be lowered until this so-called trigger-bone is depressed. They all have a long pelvic bone forming the abdominal outline, and terminating in a more or less distinct point or spine in front of the anus, sometimes absent, and sometimes with a radiated or variously sculptured base. Those having the pelvic spine constitute the genus *Monacanthus* of Cuvier, and those without it his *Aluterius;* but nearly all subsequent writers agree in uniting those groups under the first name. The sides of the tail have generally 4 or 6 conspicuous arched spines directed backwards or forwards. These are smaller or absent in the females.

In old males Dr. Günther observed that these caudal spines are directed forwards, and I give woodcuts, of the natural size, to show examples of both of these directions from specimens otherwise similar. The stripes vary considerably in different individuals.

Upper figure with small spines on tail directed backwards; lower figure with much larger spines directed forwards. Both figures natural size.

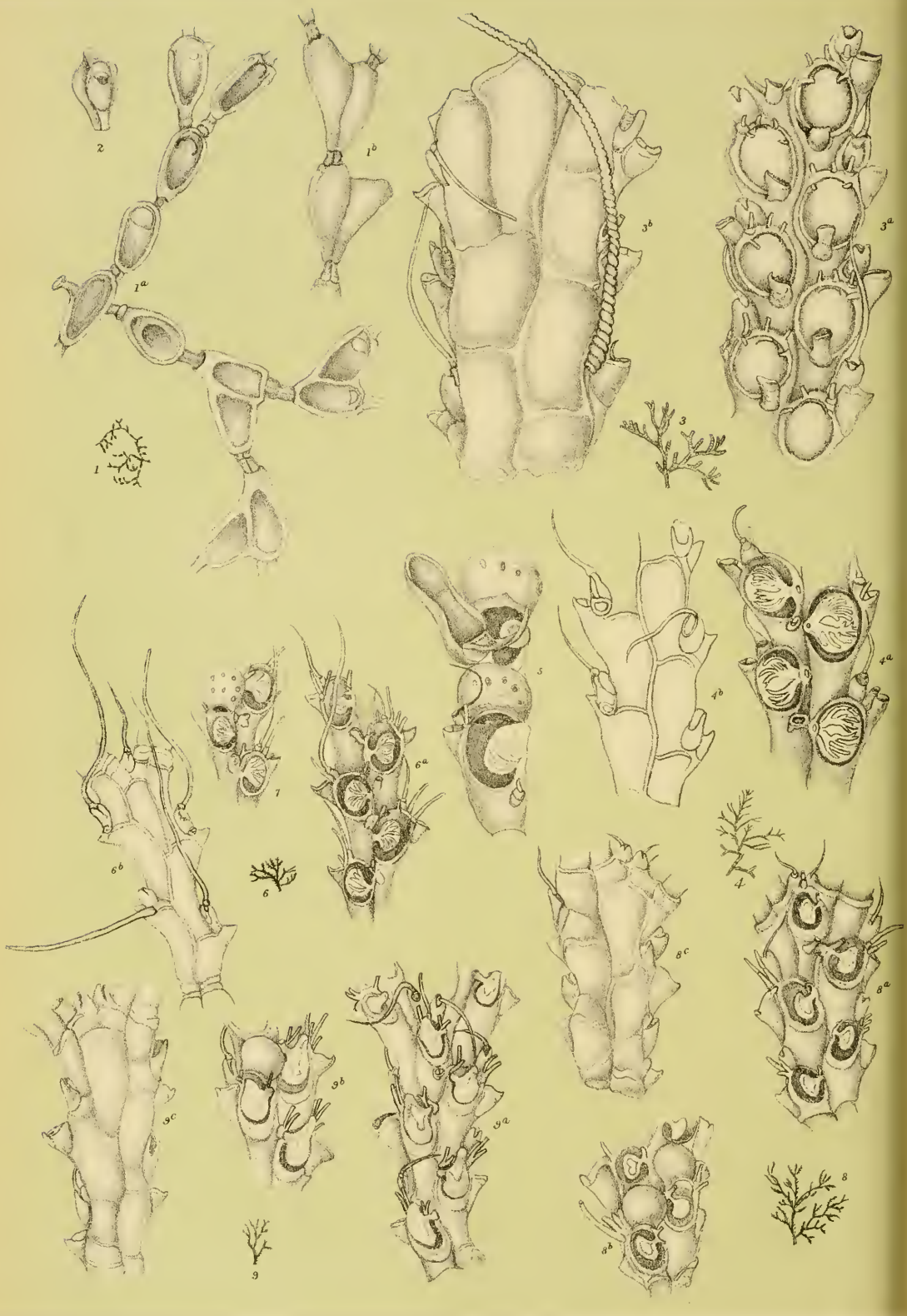
This beautiful species, with its conspicuous horse-shoe-shaped black mark on the golden-yellow patch on each side, seems to have suggested the fountain Ἱπποκρήνη, near Mount Helicon, sacred to the Muses, produced by a stroke of Pegasus' hoof, to Messrs. Quoy and Gaimard in giving it the specific name. Like most of the other Leather-jackets, it is greatly infested with a large Isopodous crustacean, which burrows in the hinder part of the abdomen.

Not uncommon at the Heads. The specimen figured was got by blasting the Lightning Rock there. It has not been figured of the colors of life before. Like the other Leather-jackets, it is good for food, although reputed poisonous.

Explanation of Figures.

Plate 125.—Fig. 1, side view of average specimen, about half natural size. Fig. 1*a*, side view of teeth, natural size. Fig. 1*b*, section at front of pectorals, half natural size. Fig. 1*c*, front view of spine, natural size. Fig. 1*d*, side view of same. Fig. 1*e*, side view of another specimen, five times the natural size. Fig. 1*f*, front view of same from upper half, to show the irregular direction of the lateral spines. Fig. 1*g*, transverse section of same spine. Fig. 1*h*, spines on scales, three times the natural size. Fig. 1*i*, side view of spines. Fig. 1*k*, one of caudal spines, magnified. Fig. 1*l*, another of ditto, magnified. Figs. 1*m* and 1*n*, two others, magnified. Fig. 1*o*, side view of 1*m*, magnified. Fig. 1*p*, pelvic spine with granules, magnified.

Frederick McCoy.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8c
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9b
9a
8b
8
9

PLATE 126, FIGS. 1-2.

MAPLESTONIA CIRRATA (McG.).

[Genus MAPLESTONIA (McG.). (Sub-kingd. Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Fam. Cellulariidæ).

Gen. Char.—Zoarium consisting of series of single or geminate zoœcia, connected by distinct corneous tubes. Zoœcia with the front wholly occupied by a membranous area, or with the lower part filled in; imperforate behind. No avicularia or vibracula. Oœcium an inflation of the posterior part of a zoœcium.]

DESCRIPTION.—Occurs in minute purplish tufts, the branches consisting of series of single and geminate zoœcia, and curling inwards. In the single zoœcia the front is usually entirely membranous, the margins being thickened and bevelled inwards; in the geminate zoœcia the lower part is generally filled in by the cell wall; the posterior surface is imperforate, and mostly marked by faint transverse lines. The mode of branching is very irregular. In all cases of geminate zoœcia each zoœcium gives origin to the first of a series, but in some cases two branches spring from the summit of a single zoœcium, or they may originate from its sides. The oœcium is very peculiar; the ovicelligerous zoœcium is terminal, broad, very much enlarged posteriorly, with a wide spout-like opening above the upper margin of the aperture.

REFERENCE.—P. H. MacGillivray, Trans. Roy. Soc. Vict., July 1884.

Portland, Mr. Maplestone; Warrnambool, Mr. Watts; Port Phillip Heads, Mr. J. B. Wilson.

EXPLANATION OF FIGURES.

PLATE 126.—Fig. 1, specimen, natural size. Fig. 1*a*, portion magnified, to show the anterior surface of the zoœcia and the mode of branching. Fig. 1*b*, small portion of the same, to show the posterior surface. Fig. 2, oœcium.

PLATE 126, FIG. 3.

SCRUPOCELLARIA CYCLOSTOMA (BUSK).

[Genus SCRUPOCELLARIA (VAN BENEDEN). (Sub-kingd. Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Fam. Cellulariidæ.)

Gen. Char.—Zoarium usually jointed. Zoœcia biserial, numerous in an internode; aperture large, rounded; each zoœcium with a sessile avicularium on the upper and outer angle, and, occasionally, another, smaller, on the front; and a sinus posteriorly lodging a vibracular cell. Oœcia superior, prominent. Radical tubes fixed to the base of the vibracular cells.]

DESCRIPTION.—Zoœcia usually about 7 in an internode, broad; aperture occupying three-fourths of the front, nearly elliptical, slightly narrowed downwards, with a narrow, clear, thickened margin, and destitute of scutum; a single or two contiguous spines at the upper and outer part, one at the inner and two above. Lateral avicularia of moderate size; on each zoœcium, immediately below the aperture, a considerable avicularium with the mandible opening upwards and forwards, on an elevated process. Vibracular cells large; vibracular setæ short and smooth. A single vibracular cell in the angle at a bifurcation. Radical tubes long

and thick, spirally annulated, especially at the commencement, but becoming smooth upwards.

Reference.—Busk, Brit. Mus. Cat. Mar. Polyzoa, pt. i., p. 24, pl. xxviii., figs. 4, 5.

Port Phillip Heads; Portland, Mr. Maplestone.

Forms tufts about three-quarters of an inch high. It is readily distinguished by the width of the branches, the large uncovered aperture, and the anterior avicularium, which is situated on an elevation directed upwards and forwards, the mandible opening transversely upwards. The only species with which it can be confounded is *S. ferox* (Busk), in which the mandible of the anterior avicularium is very much larger.

Explanation of Figures.

Plate 126.—Fig. 3, specimen, natural size. Fig. 3*a*, portion magnified, to show the anterior surface. Fig. 3*b*, dorsal view of the same.

Plate 126, Figs. 4–5.

SCRUPOCELLARIA OBTECTA (Haswell).

Description.—Zoœcia 4–9 in an internode, broad; aperture large, nearly elliptical, with a very slightly thickened margin; a large scutum* of the same shape, and covering almost the whole aperture, with two groups of digitiform markings; a single stout spine at the upper and outer part. Lateral avicularian processes small; an anterior avicularium, of rather small size, below the aperture on a rigid elevation. Vibracular setæ short and smooth. A single vibracular cell at a bifurcation. Oœcium globular, perforated by round foramina. Radical tubes smooth.

Reference.—Hincks, Ann. and Mag. Nat. Hist., March 1883.

Port Phillip Heads; Mr. J. Bracebridge Wilson.

This seems to be a rare species, as I have not found it among my own dredgings. It is readily distinguished by its large size, and the very large scutum, which is marked by two groups of conspicuous digitiform channels between its layers. Hincks describes a spine also at the upper and inner angle, which does not exist in the specimen examined by me. He also states that the radical fibres are hooked.

Explanation of Figures.

Plate 126.—Fig. 4, specimen, natural size. Fig. 4*a*, anterior view of portion of same, magnified. Fig. 4*b*, dorsal view. Fig. 5, zoœcia and oœcia from another specimen, which is much worn, except the oœcia, which are clear and distinct. This shows also an extraordinarily developed avicularium.

* This process, is in earlier descriptions, called the operculum, a term now generally restricted to the oral flap. Smitt named it the fornix, and has been followed in the *Challenger* Polyzoa by Busk, who, however, suggested the present appellation, which has been adopted by Hincks, and is used here as being the most appropriate.

PLATE 126, FIGS. 6–7.

SCRUPOCELLARIA CERVICORNIS (BUSK).

DESCRIPTION.—Zoarium small, branches narrow. Zoœcia 4–10 in an internode, elongated, wide above, narrowed below; aperture elliptical, occupying rather more than one-third of the front, margin slightly thickened; a somewhat reniform fornix, with a rather narrow peduncle, covering about half of the aperture, and marked with radiating canals obscurely arranged in two groups; a variable number of spines round the upper part; usually one, simple or branched, at the upper and inner part, two, jointed, at the outer, and one superiorly. Lateral avicularian processes large; anterior avicularia small, situated considerably below the aperture and close to the inner margin. Vibracular setæ very long, slender and smooth. Oœcia slightly contracted below, perforated by round foramina. Radical fibres smooth.

REFERENCE.—Busk, Cat. Mar. Pol. Brit. Mus., pt. i., p. 24, pl. lxii.

Port Phillip Heads.

Occurs in small glassy tufts on other Polyzoa. Busk figures and Hincks describes (Ann. and Mag. Nat. Hist., March 1883) the lateral avicularia as very small, while in my specimens they are of considerable size.

EXPLANATION OF FIGURES.

PLATE 126.—Fig. 6, specimen, natural size. Fig. 6*a*, anterior view of a portion, magnified. Fig. 6*b*, dorsal view of the same. Fig. 7, small portion of another specimen, to show the perforated oœcium.

PLATE 126, FIG. 8.

SCRUPOCELLARIA SCRUPEA (BUSK).

DESCRIPTION.—Zoœcia 5–12 in an internode, broad; aperture occupying nearly half of the anterior surface, with a thickened margin; a hammer-shaped scutum covering about half of the aperture, rounded below, and narrowed and slightly turned forwards above; a stout, occasionally bifurcate spine directed forwards at the base of the peduncle of the scutum, and usually about 3 from the upper and outer part. Lateral avicularian processes of moderate size or, occasionally, very large; anterior avicularia rare, small, on a somewhat columnar elevation, and with a very small mandible. Vibracular setæ short and slender; usually two vibracular cells in the angle of a bifurcation. Oœcia smooth, imperforate. Radical tubes smooth, ending in rosette-like expanded extremities.

REFERENCE.—Busk, Brit. Mus. Cat. Mar. Polyzoa, pt. i., p. 24, pl. xxi., figs. 1, 2.

Port Phillip Heads; Portland, Mr. Maplestone.

Forms small white tufts, half an inch or more in height. There can, I think, be no doubt that this is identical with the common European species, of which, however, the only specimens I have are rather imperfect.

EXPLANATION OF FIGURES.

PLATE 126.—Fig. 8, specimen, natural size. Fig. 8*a*, view of anterior surface, magnified. Fig. 8*b*, another portion of the same, showing two ovicells. Fig. 8*c*, dorsal surface.

PLATE 126, FIG. 9.

SCRUPOCELLARIA ORNITHORHYNCHUS (WYV. THOMSON).

DESCRIPTION.—Branches of zoarium slender. Zoœcia elongated, narrowed downwards; aperture elliptical, occupying rather less than half the front, with a thickened margin much wider below; scutum much projected forwards, extending the whole length of the aperture, somewhat pyriform, the upper extremity produced into a narrow point, and turned forwards; a bifurcate or double spine close to the base of the peduncle of the scutum, and 3 or 4 long, slender spines from the outer and upper part of the aperture. Lateral avicularian processes usually very large; anterior avicularia very small, situated on eminences below the apertures. Vibracular setæ short, slender, smooth. Two vibracular cells at a bifurcation. Oœcia smooth, imperforate.

REFERENCE.—Wyville Thomson, Dublin, Nat. Hist. Rev., July 1858, p. 144, pl. xii., fig. 2; Busk, *Challenger* Polyzoa, pt. i., p. 24, pl. xi., fig. 6.

Port Phillip Heads and elsewhere.

In some of my specimens it is difficult to discriminate between this and *S. scrupea*. The chief distinctions are in its smaller size, the more slender zoœcia, the extremely long scutum, which is much projected forwards, overlaps the whole length of the aperture, and has the upper extremity pointed and turned forwards. The arrangement of the spines is much the same in both, although in the present they are usually more slender and longer, and the inner one is almost always bifurcate or double. In both, the lateral avicularian process is of considerable size, and there are two vibracular cells in the angle at a bifurcation. The margin of the aperture is usually much more thickened below, and is occasionally slightly tubercular. Thomson describes the scutum as ending in a spine, and figures this as very long. There can, however, be no doubt that this is the species intended by him.

EXPLANATION OF FIGURES.

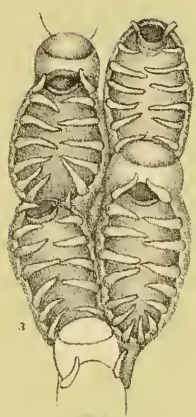
PLATE 126.—Fig. 9, specimen, natural size. Fig. 9*a*, anterior view, magnified; in this portion the branches at the bifurcation are continuous, not articulated. Fig. 9*b*, another portion of the same, showing oœcia. Fig. 9*c*, dorsal view.

I am indebted to Mr. MacGillivray for the specimens and descriptions of the Polyzoa on this plate.

FREDERICK MCCOY.

* 127

Non-transfer
Amphibolastrum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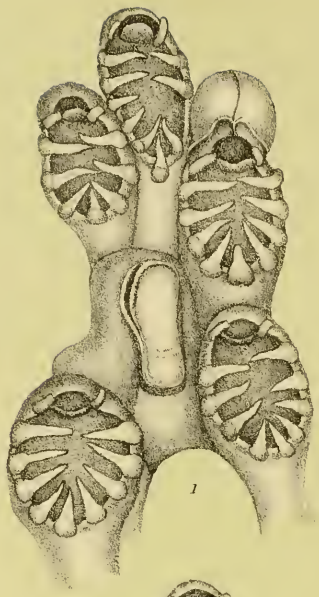
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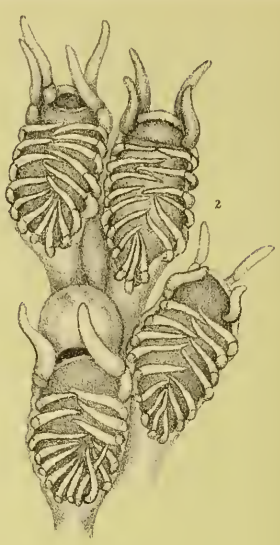
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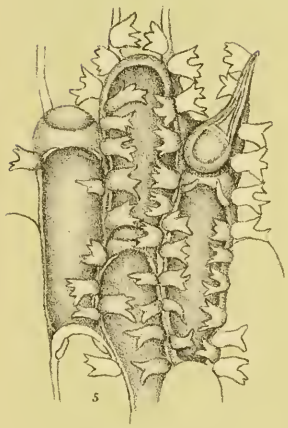
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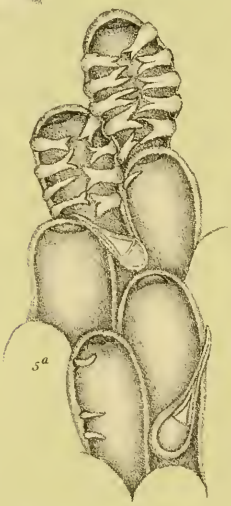
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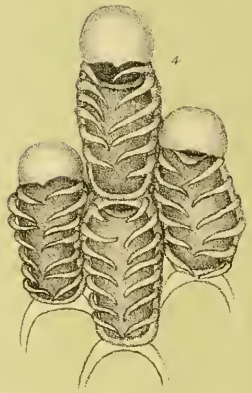
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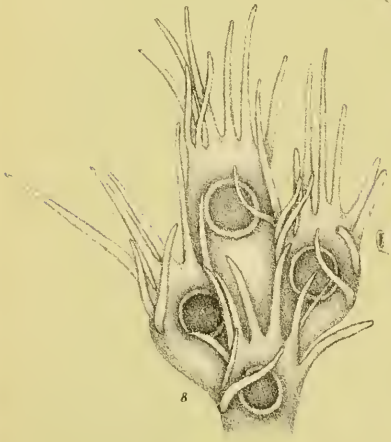
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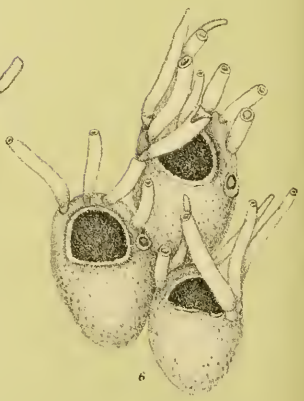
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PLATE 127, FIG. 1.

MEMBRANIPORA PYRULA (HINCKS).

[Genus MEMBRANIPORA (BLAINVILLE). (Sub-king. Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Fam. Membraniporidæ.)
Gen. Char.—Zoarium spreading, encrusting, or occasionally sub-erect. Zoœcia contiguous, quincuncial or in transverse and longitudinal series, separated by raised margins; front membranous, but cell frequently produced below the area.]

DESCRIPTION.—Zoœcia pyriform, produced below the area, which is elliptical, with slightly thickened margins; two small, lateral oral spines; a series of 4 broad, incurved spines on either side, and 1–3 on the inferior edge. Oœcia large, with a distinct vertical ridge and a shallow pyriform depression or pit on each side of the margin. Avicularia scattered, replacing cells, with broadly spatulate mandibles.

REFERENCE.—*M. lineata*, P. McG., in Decade III.; *M. pyrula*, Hincks, Ann. and Mag. Nat. Hist., July 1881.

Port Phillip Heads, common; Portland, Mr. Maplestone.

In the absence of authentic specimens or good figures, I previously referred this to *M. lineata*, Busk's figure of which my first mutilated specimens very much resembled. It is, however, quite distinct, and I therefore give a fuller description and better figure. The spines are very large, glistening, rib-like, and arch over the area, nearly meeting in the middle. They are attached a little beyond the edge by a slightly bulbous origin, and are usually 4 on each side and 1 or sometimes 2 or 3 at the bottom. The small oral spines are frequently absent. The avicularia are, in most specimens, numerous. They take the place of cells, and the mandible is very broadly spatulated.

EXPLANATION OF FIGURE.

PLATE 127.—Fig. 1, group of zoœcia, showing an oœcium and avicularium, magnified.

PLATE 127, FIG. 2.

MEMBRANIPORA CORBULA (HINCKS).

DESCRIPTION.—Zoœcia distinct, elongated, narrow below; area occupying nearly the whole front, its margin slightly thickened; 2 or 4 very large, pod-like, erect, oral spines; on each side of the area a series of usually 7 broad, incurved spines meeting in the middle and sometimes crossing. Oœcia globose, smooth, with

a broad, thickened band at the margin, and with several glistening lines radiating on the summit.

REFERENCE.—Hincks, Ann. and Mag. Nat. Hist., Nov. 1880.

Port Phillip Heads ; Portland, Mr. Maplestone.

At once distinguished from *M. pyrula* and the other spinous species by the large, pod-like, articulated oral spines. Of these there are usually 4, but sometimes only 2. The marginal spines arise from bulbous origins closer to the margin than in *M. pyrula*, and bend over the area, meeting in the centre and frequently overlapping. The zoarium occasionally creeps over Bicellaria and other Polyzoa in a single, linear series.

EXPLANATION OF FIGURE.

PLATE 127.—Fig. 2, group of zoœcia, showing an oœcium, magnified.

PLATE 127, FIG. 3.

MEMBRANIPORA INARMATA (HINCKS).

DESCRIPTION.—Zoœcia large, distinct, usually oval, and rounded above and below; area occupying the whole of the front of the cell; a small, nearly erect spine on each side above, and a series (about 5 or 7) of narrow, incurved spines on each side. Oœcium projecting into the base of the zoœcium above, crossed at its base by a band formed by the cell-margin.

REFERENCE.—Hincks, Ann. and Mag. Nat. Hist., July 1881.

Port Phillip Heads, dredged by Mr. J. B. Wilson and myself.

The marginal spines are much more slender and have wider intervals between them than in *M. pyrula* and *corbula*. The oœcium projects into the base of the cell above, and has a thickened collar at the base formed by the cell-margin, an arrangement which also occurs in *M. serrata*.

EXPLANATION OF FIGURES.

PLATE 127.—Fig. 3, group of zoœcia, showing oœcia. Fig. 3*a*, single zoœcium, with oœcium.

PLATE 127, FIG. 4.

MEMBRANIPORA PECTINATA (McG.).

DESCRIPTION.—Zoœcia large, distinct, oval; 6–8 long, stout spines on each side, sloping forwards and inwards, and nearly meeting in the middle. Oœcia small, smooth, with the edge of the orifice straight, or with a short, sharp beak.

Port Phillip Heads.

I was at first inclined to refer this handsome species to *M. flustroides* (Hincks), but I think there is no doubt of their distinctness. The zoœcia are large, with a row of about 6 or 8 spines on each side. These spines are very long, projecting forwards and inwards in a very slightly curved manner, and, in some instances, nearly meeting in the centre. In a few zoœcia there are two shorter, smaller, more erect spines at the upper end. The oœcium is small, semi-globular and glistening. In the older there is a prominent, beak-like projection from the lower margin; in the younger the edge is smooth. Occasionally there is an obscure elevation running down the centre, and in some there is a thickening below showing an approximation to the transverse collar in *M. inarmata*.

EXPLANATION OF FIGURE.

PLATE 127.—Fig. 4, portion of specimen, magnified.

PLATE 127, FIG. 5.

MEMBRANIPORA SERRATA (McG.).

DESCRIPTION.—Zoœcia elongated, quadrate, or wider about the middle, or pointed below; area occupying the whole front, except occasionally the lower angles; margin plain, with a few acicular spines, or with numerous, serrated, horizontal denticles. Avicularium on a separate area at the base of a zoœcium; mandible very long. Oœcium projecting into the base of the cell above, crossed by a band in front.

REFERENCES.—*M. serrata*, P. MacGillivray, Trans. Roy. Soc. Vict., 1881; *M. acifera*, P. MacGillivray, Trans. Roy. Soc. Vict., 1881.

Port Phillip Heads.

This species can always be distinguished by the elongated, quadrate zoœcia, the position of the avicularium with its long mandible, and the rounded oœcium projecting into the base of the zoœcium above with its transverse collar formed by the cell-margin. In some cases the cells are entirely unarmed; in others there are one, two, or more uncinate spines; while, in most, the margins are thickly fringed with short, broad-ended, serrated denticles directed horizontally inwards. In many specimens the uncinate spines alone occur, and in others there are only the serrated denticles,

which induced me to describe these forms as distinct species. I have since, however, found specimens in which both co-exist, as is shown in that figured.

EXPLANATION OF FIGURES.

PLATE 127.—Fig. 5, portion of a specimen, showing the serrated denticles, two oœcia, and an avicularium. Fig. 5*a*, other zoœcia from the same, two of which are unarmed, two with uncinate spines, and the others with the serrated denticles, which are simpler and narrower than in the other figure; two avicularia are also shown.

PLATE 127, FIG. 6.

MEMBRANIPORA CILIATA (McG.).

As the figure given on Plate 25 is not quite correct, I give another. It is doubtful whether this species ought to be considered as a *Membranipora* with the cell produced below the area, or referred to *Amphiblestrum*. In some zoœcia there is a decided, though very narrow rim, while in others it is absent or only faintly indicated, as in the figure. The spines are sometimes thinner than in the figured specimen, but never so slender as shown in Plate 25.

In addition to the localities previously mentioned, Mr. Maplestone has found it at Portland.

PLATE 127, FIG. 7.

AMPHIBLESTRUM ALBISPINUM (McG.).

[Genus AMPHIBLESTRUM (GRAY). (Sub-kingd. Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Fam. Membraniporidæ.)

Gen. Char.—Zoarium encrusting. Zoœcia with the aperture occupying the whole front, or with part of the zoœcium produced below; aperture partly filled in by an additional membranous or usually calcareous lamina.]

DESCRIPTION.—Zoœcia elongated, narrowed and extended downwards beyond the area; aperture occupying about half of the area, the lower margin slightly thickened; on each side a series of 3–5 enormous, pod-like, articulated spines, and generally 2 or 3 smaller from the upper margin.

REFERENCE.—P. H. MacGillivray, Trans. Roy. Soc. Vict., Dec. 1881.

Queenscliff; Portland, Mr. Maplestone.

The zoœcia are much elongated downwards, almost trumpet-shaped, the area oval, surrounded by a thickened margin. When the zoœcia are closely packed, their real structure is not easily made out, but when straggling over a narrow alga, it is well seen, as in the figure.

Explanation of Figure.

Plate 127.—Fig. 7, portion of a specimen on a narrow alga, magnified.

Plate 127, Fig. 8.

MEMBRANIPORA SPINOSA (Quoy and Gaimard).

Description.—Zoœcia irregularly arranged, extending downwards beyond the area, which is sub-circular, with a thickened rim; a fringe of (about 7) long, rigid, pointed spines, usually united at their bases, surrounding the upper part of the zoœcium.

References.—Figured by Busk in Polyzoa of Kerguelen's Land, Phil. Trans., vol. 168, pl. x., fig. 3; P. H. MacGillivray, Trans. Roy. Soc. Vict., Dec. 1881.

I have not seen the description in the voyage of the *Astrolabe*, and Busk's figure represents the zoœcia as much more regular, and does not show the common basis supporting the fringe of long, stiff spines. This is rather exaggerated in the figure, taken from a specimen where it was well marked, and in some cases it is almost wanting. It is only at the extreme edge of the zoaria that the arrangement of the zoœcia can be seen, being obscured at the other parts by the dense forest of spines.

Explanation of Figure.

Plate 127.—Fig. 8, small portion. magnified. The common basis uniting the spines has been made too large.

The specimens and descriptions of these additional species of *Membranipora* have been presented by Mr. MacGillivray.

Frederick McCoy.

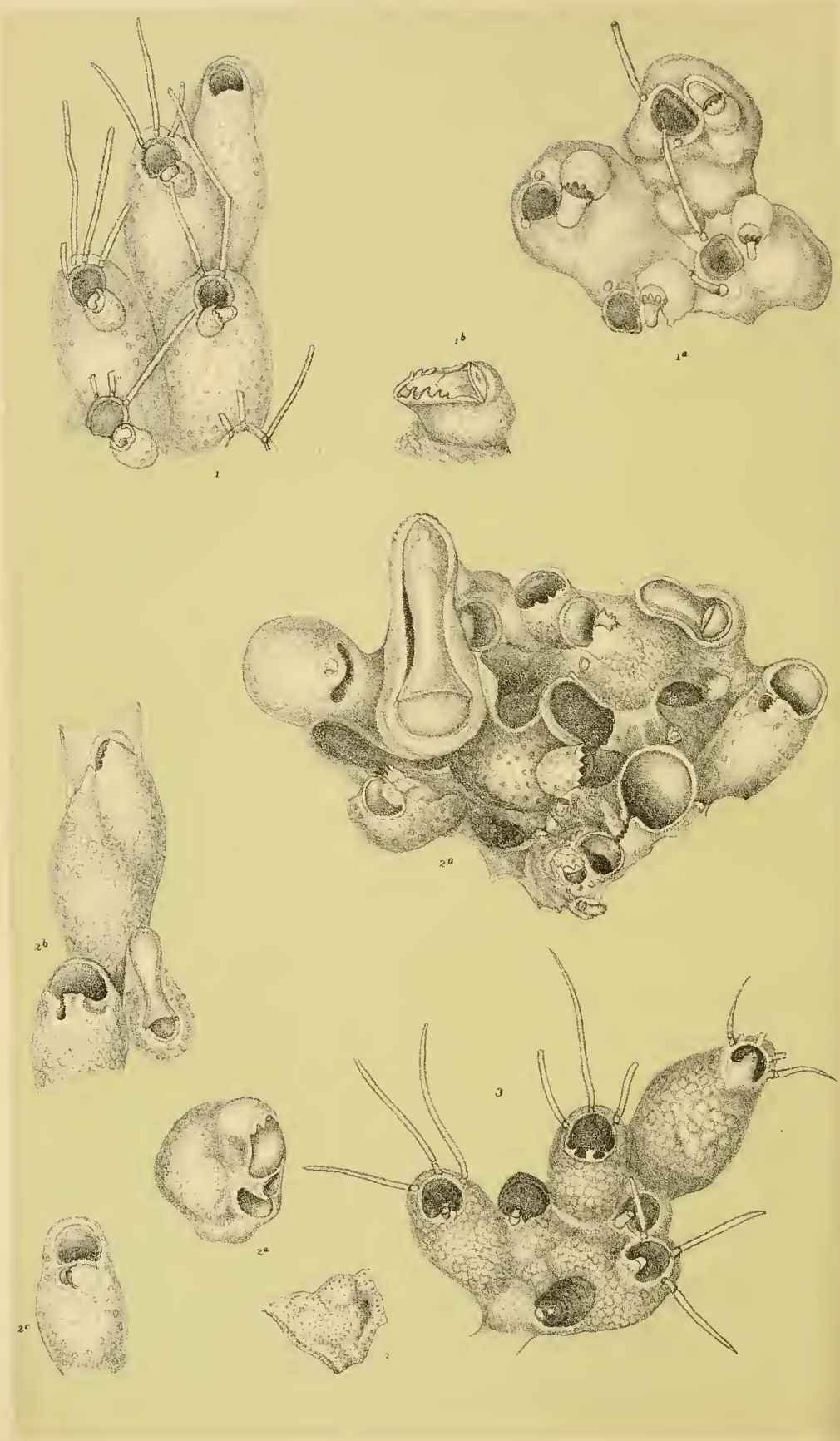

1
1a
1b
2a
2b
2c
2d
3

PLATE 128, FIG. 1.

CELLEPORA SPECIOSA (McG.).

[Genus CELLEPORA (FABRICIUS). (Sub-kingd. Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Fam. Celleporidæ.)

Gen. Char.—Zoarium encrusting, partly adnate, massive, foliaceous, erect and ramose, or glomerulous. Zoœcia, in the older parts, more or less erect and irregularly heaped together; one or more rostral processes (occasionally absent), usually bearing avicularia, in the neighbourhood of the mouth. Generally scattered vicarious avicularia.]

DESCRIPTION.—Zoarium encrusting. Marginal zoœcia horizontal, older irregularly heaped; surface smooth or finely granular; mouth straight and entire below; 2–4 long, slender spines articulated above; to one side of the lower lip an elevated, sessile avicularium, the mandible broadly linguate and the rostrum sharply dentate. Vicarious avicularia large, elongated, on elevated calcareous processes, the edges of the rostrum with several strong, recurved teeth.

Port Phillip Heads.

I have only seen a single small specimen, growing on a Retepore. It somewhat resembles *C. serratirostris*, but is distinguished by the long, articulated spines, the entire lower lip, and the different shape of the mandibles of the oral avicularia.

EXPLANATION OF FIGURES.

PLATE 128.—Fig. 1, zoœcia from the growing edge. Fig. 1*a*, zoœcia from an older portion. Fig. 1*b*, vicarious avicularium.

PLATE 128, FIG. 2.

CELLEPORA SERRATIROSTRIS (McG.).

DESCRIPTION.—Zoarium encrusting. Zoœcia much confused, granulated; the younger, towards the growing edge, decumbent, elongated; the older more erect, stouter and confused; mouth at first entire, then with a deep sinus which becomes bridged across or closed by the junction of the opposite angles; a sub-oral process, usually bending to one side, with a large avicularium at the summit. Avicularia very numerous and of various forms, scattered over the zoarium; some very large, with long, spatulate, blunt or pointed mandibles, raised on considerable boat-like elevations; some spatulate and smaller; some on rounded cells, with broad mandibles and serrated rostra. Oœcia rounded.

REFERENCE.—P. H. MacGillivray, Tr. Roy. Soc. Vict., Dec. 1884.

Port Phillip Heads.

The very youngest zoœcia have the mouth straight and entire below, but, in almost all, a process of the peristome is seen rising on each side, eventually meeting in the centre and leaving a round opening which in time becomes filled in. Below the mouth a process rises on one side, extending upwards and to the opposite side, with a considerable avicularium on its summit, the edge of the rostrum being serrated. In some marginal zoœcia this process is very large and directed upwards, the avicularium situated obliquely on the summit. The older zoœcia vary much in form, being usually short and oblique or nearly erect. The sub-oral pore of the peristome can frequently still be seen, and the peristome is also, in some cases, produced above in a hooded manner, like a commencing oœcium, or it may be almost tubular with a slit in the lower edge. The aviculiferous process below the mouth is usually of small size, but is occasionally enormously developed, so as to be larger than the zoœcium itself. There are numerous vicarious avicularia, with spatulate mandibles, much raised, the point of the calcareous eminence frequently projecting over part of the neighbouring zoœcia.

Explanation of Figures.

Plate 128.—Fig. 2, specimen, natural size. Fig. 2*a*, portion of central part of same, magnified. Fig. 2*b*, marginal zoœcia. Fig. 2*c*, single zoœcium, showing the sub-oral pore and short aviculiferous process. Fig. 2*d*, enormously developed sub-oral avicularium, showing the broad mandible, serrated rostrum, and mouth of the zoœcium (in the figure beneath the avicularium).

Plate 128, Fig. 3.

CELLEPORA TRIDENTICULATA (Busk).

Description.—Zoarium small, encrusting. Zoœcia immersed, irregular; surface granular; mouth straight below, rounded above, with 2–4 long, slender spines articulated above, and 3 small denticles (the middle hammer-shaped) within the lower margin. A minute avicularium, with a semicircular mandible, on a slightly elevated sub-oral rostrum.

Reference.—Busk, *Challenger* Polyzoa, p. 198, pl. xxix., fig. 3.

Port Phillip Heads ; Warrnambool, Mr. Watts.

Of this species I have only two or three minute specimens, the only perfect one of which is that figured. It seems to be identical

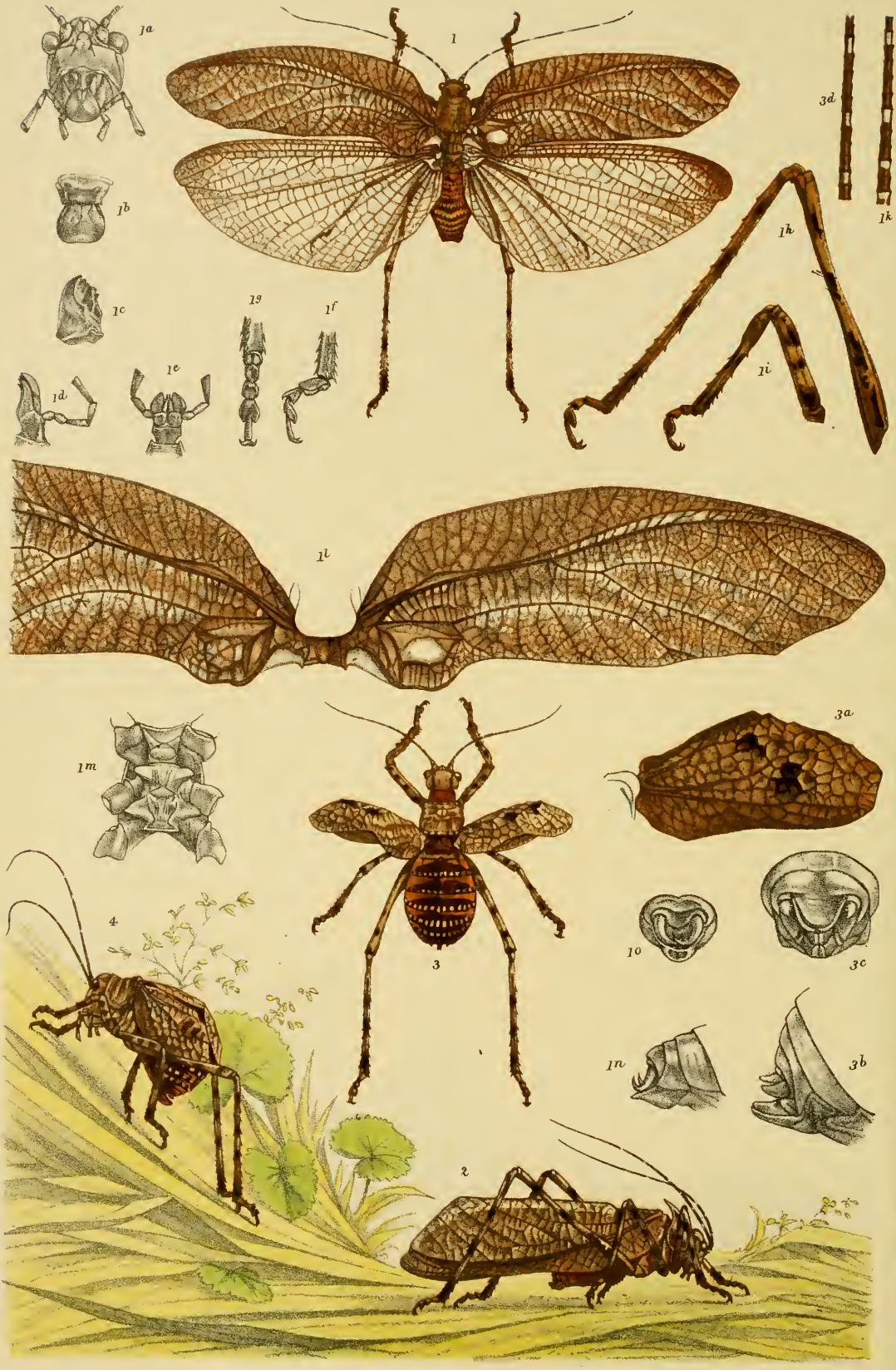
with Busk's *C. tridenticulata*, although not entirely agreeing with the characters given by him. The number of spines, in my specimens, varies from 2 to 4 ; they are long, slender, and nearly straight. The zoœcia are very irregularly placed, immersed ; the surface granular and glistening. The sub-oral avicularium (absent in some zoœcia) is very small, usually situated on a slightly elevated rostrum, which, however, is occasionally considerably developed. I have not seen the oœcia nor the vicarious avicularia with the long tubular processes described by Busk.

EXPLANATION OF FIGURE.

PLATE 128.—Fig. 3, portion of specimen, magnified.

The specimens and descriptions of the *Celleporæ* on this plate are from Mr. MacGillivray.

FREDERICK McCOY.



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Prof. McCoy direx.

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PLATE 129.

ACRIPEZA RETICULATA (GUERIN).

THE NETTED ACRIPEZA.

[Genus ACRIPEZA (GUÉRIN). (Sub-kingd. Articulata. Class Insecta. Order Orthoptera. Section Saltatoria. Fam. Gryllidæ.)

Gen. Char.—Head small, oval, with a small frontal projection. Antennæ approximate, long, capillary, 1st joint large, 2nd short. Eyes globular, very prominent. Labrum rounded; mandibles pointed; maxillary palpi a little longer than the labial, terminal joint truncated, slightly swollen at tip, a little longer than the penultimate joint. Prothorax short, disc slightly flattened, transversely ridged, posterior margin very rounded, lateral keels slight. Presternum smooth, without spines, meso- and meta-sternum wide, most so in females. Elytra of female nearly as long as abdomen, hard, curved so as to fit over the back and sides of the abdomen, with very strong, prominent reticulations; of male long, narrow, rounded at tip, extending beyond the abdomen when at rest, longitudinal veins sinuous; stridulating organ opaque on left, with transparent centre on right. Wings absent in female; large in male, with anterior third covered with large, coarse reticulated ridges, rest of wing with the usual veining of the Gryllidæ. Abdomen short, thick, swollen in female, with ovipositor and appendages very small, scarcely visible; moderate in male, with setaceous appendages, short, curved inwards at tip; sub-anal plate of male notched at tip, not extending beyond tip of abdomen. Feet long, slender; thighs smooth; legs thick at extremity, with some fine short spines, anterior tibiæ with oval cavity at base covered by a membrane; posterior feet moderately short in the female, very long in the male; thighs of male slender, as large as tibiæ; upper keels of tibiæ with very small spines. Australia.]

DESCRIPTION.—*Male:* Elytra narrow; elytra and wings nearly three times as long as the abdomen; stridulating spot on base of right tegmina large, clear, transparent, and colorless, covered over by the left tegmina when at rest. Veining coarse and irregularly reticulated, but less so than in the female. Wings large, transparent, with brown veins, and slightly opaque and brown at anterior edge and tip. Length from forehead to end of abdomen, 9½ lines; length of each of the elytra (or tegmina) and wings, 1 in. 8 lines; width of tegmina, 7 lines; length of antennæ, 1 in. 1 line; length of thorax, 3 lines; length of hind thigh, 10 lines; length of hind tibia, 11 lines; length of anterior thigh, 4 lines; length of anterior tibia, 4 lines. *Color:* Of thorax and tegmina nearly opaque, dark brown, with indistinct greyish and blackish cloudy markings or spots; abdomen dark brown with lateral red bands on anterior part of each segment above; the edges of the segments have a row of about 18 small, longitudinal, bright blue, oblong spots; antennæ and legs blackish-brown, with transverse bands of pale yellowish-brown; head lighter, with two black bands from the eyes to the prothorax; anterior edge of prothorax showing a cinnabar-red band when head is bent down, invisible when head erect. *Female:* Length from forehead to end of abdomen, 1 in.; length of tegmina, 9 lines; length of abdomen, 8½ lines; depth of abdomen, 6 lines; width of tegmina from one inrolled edge to the other, 4 lines; length of thorax, 3 lines; length of antennæ, 1 in. 1 line; length of hind thigh, 8 lines; of hind tibia, 8½ lines; length of anterior thigh, 4½ lines; length of anterior tibia, 4 lines; abdominal appendages, ¾ line. Elytra oval, little longer than the abdomen, and curved so as to fit its convexity when covering it above and on the sides when at rest; with very prominent, coarse, unequal, irregularly anastomosing netted veins; abdominal segments plicated on hind edge; thorax oblong, flattened above, deflected at sides, posterior edge plicated, two transverse impressed lines in front. *Color:* Head yellowish-grey with irregular mottlings of black, two

broad longitudinal black bands from inner edge of eye to posterior margin of head, and one on each side from hind middle of eye extending on to lower margin of thorax, forming two spots, or a band interrupted in the middle; thorax colored like head, but with collar of bright vermilion-red between its anterior margin and the head; elytra nearly opaque, dark greyish-brown, with two large, irregular, roundish, black spots, one at middle, and the larger between it and the tip of each elytron; abdomen blackish-brown, the anterior margins above cinnabar-red, and the fimbriated posterior edges each with a row of small turquoise-blue spots, about 9 on each side; thighs, tibiæ, and palpi yellowish-grey, with broad transverse bands of black; antennæ black, with narrow distant transverse bands of greyish-yellow, less distinct than in the male.

Reference.—Voy. de la Coquille, vol. 2, pt. 2, p. 153; At. Ins., t. 10, f. 2.

This most abnormal genus differs from all others of the order in the large vaulted tegmina wrapping round the short swollen abdomen in the female, and in that sex being without wings; while the male has the ordinary elongation and shape of abdomen and elytra, and has ample wings. The small size of the ovipositor is an exception to the rule in the family *Gryllidæ*.

Like all the Grasshoppers, or *Gryllidæ*, the tarsi of *Acripeza* are 4-jointed, unlike the 3-jointed tarsi of the Locusts, which they resemble in the shortness of the ovipositor. In the long slender antennæ, the drum in base of anterior tibiæ, and slender legs and thighs, and the stridulating apparatus at base of anterior wing, they are in accord with the *Gryllidæ*. The *Acripezæ* are, however, very peculiarly distinguished from both by the apterous, deformed females; and the extraordinarily rugged, coarse reticulation of the elytra.

Explanation of Figures.

Plate 129.—Fig. 1, male, natural size, in a flying position. Fig. 1*a*, front of head, magnified three diameters. Fig. 1*b*, upper lip, magnified three diameters. Fig. 1*c*, maxilla, magnified three diameters. Fig. 1*d*, mandible, showing small toothed apex, hood, and 5-jointed palpus, magnified three diameters. Fig. 1*e*, lower lip, showing 4 lobes and 3-jointed palpi, magnified three diameters. Fig. 1*f*, tarsus, side view, showing 4 joints. Fig. 1*g*, tarsus, viewed from below, showing division of basal joint, magnified three diameters. Fig. 1*h*, hind leg, magnified two diameters. Fig. 1*i*, anterior leg, magnified two diameters, showing drum in base of tibia. Fig. 1*k*, portion of antennæ, magnified six diameters. Fig. 1*l*, elytra, magnified two diameters, to show reticulation and talc-like stridulating organ at base of right elytron and its absence from base of left one. Fig. 1*m*, sternum, showing pairs of spines between bases of legs, magnified two diameters. Fig. 1*n*, side view of termination of abdomen, showing long appendages and sub-anal plate, magnified three diameters. Fig. 1*o*, same, viewed from behind. Fig. 2, male, in walking position, viewed sideways, natural size. Fig. 3, female, viewed from above, with elytra raised, natural size. Fig. 3*a*, right elytron, magnified two diameters, showing reticulation and absence of stridulating spot at base. Fig. 3*b*, side view of posterior end of abdomen, showing short appendages and ovipositor, magnified three diameters. Fig. 3*c*, same, viewed from behind. Fig. 3*d*, portion of antennæ, magnified six diameters. Fig. 4, female, with elytra covering abdomen, side view, natural size.

Frederick McCoy.

ZOOLOGY OF VICTORIA

(Insects)

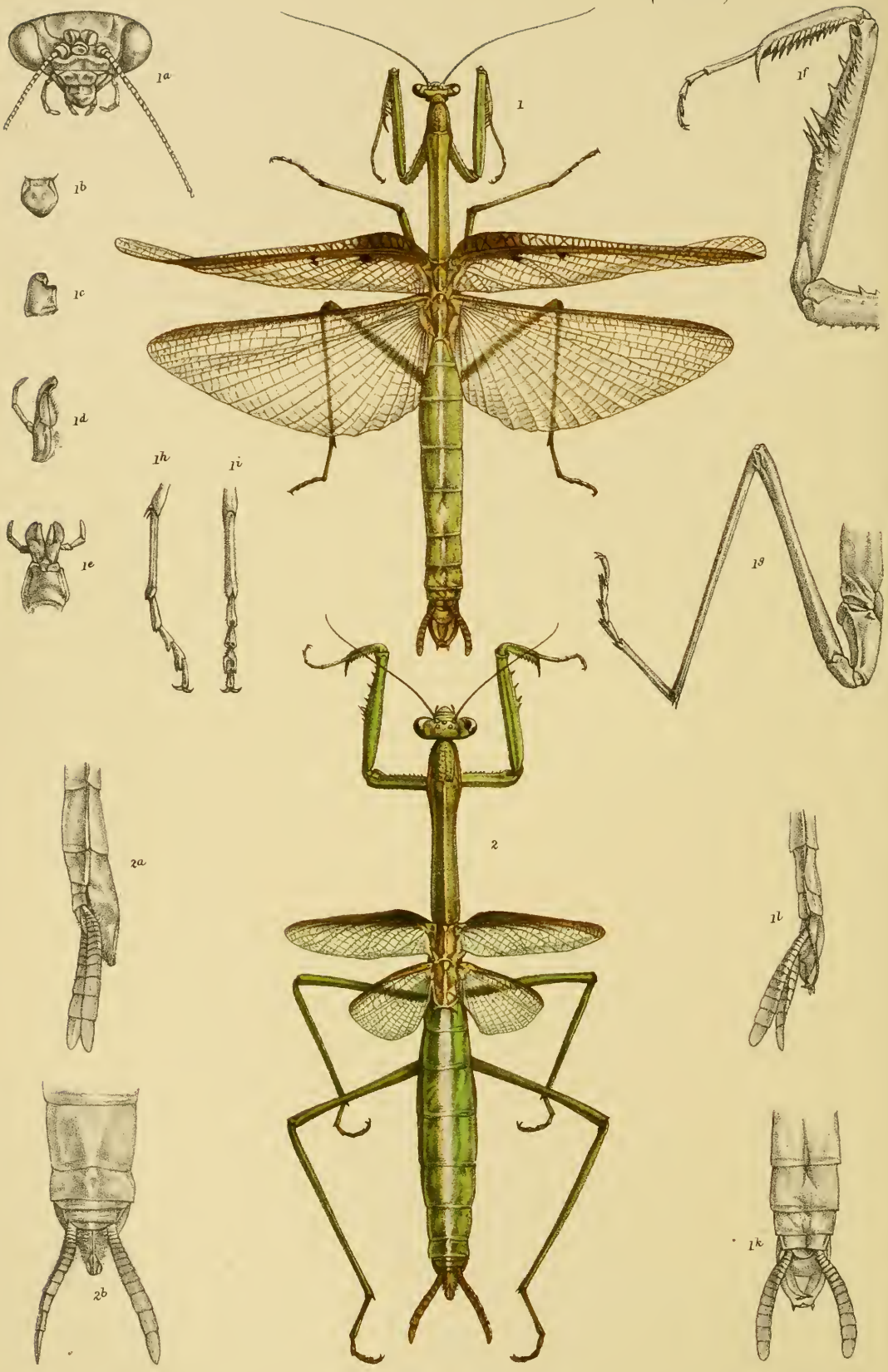

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PLATE 130, FIGS. 1-2.

MANTIS LATISTYLUS (SERV.).

THE BROAD-STYLED MANTIS.

[Genus MANTIS (LIN. RESTRICTED). (Sub-kingd. Articulata. Class Insecta. Order Orthoptera. Section Raptoria. Fam. Mantidæ.)

Gen. Char.—Body elongate, smooth. Head wide, triangular, anterior face divided transversely, upper part girt round on the sides and in front by a semicircular ridge; vertex smooth. Eyes large, rounded; ocelli, 3, in a triangle, above the antennæ and between the eyes, much larger in the male than the female. Antennæ setaceous, multiarticulate, hair-like in the female, thicker and much longer in the males, between the eyes. Labium (or lower lip) of 4 nearly equal lobes jointed near middle; palpi short, 3-jointed; labrum (or upper lip) ovate, entire; mandibles strong, trigonal, with 1 strong tooth below and 2 or 3 at apex; maxillæ long, outer lobe galeated, inner lobe with 2 teeth at apex; palpi of 5 filiform joints, pointed, tips reaching little beyond maxillæ. Prothorax very long, narrow, smooth, a little dilated laterally at its anterior part, where the anterior pair of legs are attached; margined on the sides; rest of thorax short, concealed by the tegmina and wings when at rest; no scutellum. Abdomen of 9 dorsal joints in both sexes; 6 ventral in female, and 8 in male, simple to the tip, depressed, dilated laterally behind the middle, most so in the female; 2 articulated processes at tip, and a short inarticulate pair in male. Tegmina elongate, oval. Legs long, 2 hind pair simple, anterior pair raptorial. Tarsi five-jointed, the first joint much longer than the others.]

DESCRIPTION.—*Female:* Body moderate, narrow. Head very wide; eyes very large, prominent; antennæ very slender, about half the length of the prothorax. Prothorax with a strong median keel, a smaller lateral marginal one on each side, slightly serrated on anterior half; dilatation over anterior legs small, anterior fourth having an oval granular space surrounded by an impressed line, and having midlines impressed; hinder portion smooth. Abdomen smooth, slightly dilated behind the middle; articulated styles large, pubescent, equal in length to the two first joints of abdomen, the 6 or 7 basal joints short, narrowed, less than half as long as wide, and convex; 7 or 8 terminal joints, wider, longer, flattened, and the terminal and penultimate ones longer than wide. Legs moderate, coxæ of anterior pairs half the length of prothorax, with a row of fine irregular spines on anterior ridge; thigh about two-thirds the length of prothorax, with 5 or 6 long, strong spines on outer lower ridge, and more numerous, smaller ones on inner margin of groove; tibia about half the length of the thigh, ending in a long, curved, sharp spine, with a row of about 12 small spines on each of the two posterior ridges. Wings very short; elytra not reaching half the length of the abdomen, narrow, nearly equally wide throughout, elliptically pointed at end, with posterior two-thirds transparent; wings only two-thirds the length of the elytra, broad, transparent, except the narrow anterior border. *Color:* Body and legs all green, with brownish tinges especially on sides of prothorax, with a conspicuous satiny-white longitudinal band along middle of upper side of abdomen, and meta- and meso-thorax; antennæ, tarsi, and abdominal styles brown. *Measurements:* Length, 3 ins. 6 lines. Proportional measurements to length, taken as unity: Length or depth of vertical face, $\frac{8}{100}$; width of head, including eyes, $\frac{10}{100}$; length of antennæ, $\frac{20}{100}$; length of prothorax, $\frac{33}{100}$; mesothorax, $\frac{7}{100}$; metathorax, $\frac{10}{100}$; length of abdomen, $\frac{46}{100}$; articulated styles, $\frac{15}{100}$; length of anterior coxæ, $\frac{19}{100}$; width, $\frac{4}{100}$; femur, $\frac{21}{100}$; length of elytra, $\frac{27}{100}$; width, $\frac{9}{100}$; length of wing, $\frac{16}{100}$; width, $\frac{10}{100}$. *Male:* More slender,

and with smaller, raptorial anterior legs than the female; prothorax similarly keeled, but the anterior portion in front of legs less distinctly granular; elytra and wings extending nearly to end of abdomen; articulated styles as in female, but, in addition, 2 very small inarticulate styles at end of last segment below, $\frac{1}{3}$ line long, and 2 hooked processes two-thirds of a line long in middle. *Color:* All brown on body, legs, and anterior margin of elytra and wings, the hinder portions of wings and elytra equally colorless and transparent, a large oval patch on the under-side of anterior base of elytra of the color and lustre of pitch, as in the female, slightly showing through the brown of the upper side; in many specimens two small black spots on elytra close below the strong vein bounding the anterior margin, at about the width of the elytra from their base, the second smaller one about the same distance farther towards tip (the outer, or sometimes both these, spots absent). Length, 3 ins. 6 lines; width of head and eyes, $\frac{9}{100}$; length of antennæ, $\frac{35}{100}$; length of prothorax, $\frac{33}{100}$; articulated styles, $\frac{10}{100}$; length of coxæ of anterior raptorial legs, $\frac{16}{100}$; width, $\frac{3}{100}$; femur, $\frac{19}{100}$; length of elytra, $\frac{56}{100}$; width, $\frac{11}{100}$; width of front margin at middle, $\frac{3}{100}$; length of wing, $\frac{53}{100}$; width, $\frac{25}{100}$; width of colored front margin at middle, $\frac{2}{100}$.

Reference.—Audinet Serville Hist. Nat. des Insect. Orthop., p. 179.

In all the species of *Mantis* the males have the body longer and more slender, the head and legs smaller, the wings larger, and the elytra more transparent, longer, and more pointed than in the female. The terminal segment of the abdomen of females is as large as the preceding ones, but is very small in the males. The upper wings or tegmina have numerous veins, are lapped one over the other horizontally on the back when at rest, and in the males are nearly of the same consistence as the hind wings.

The long oval eggs are laid in a roundish lump attached to twigs of trees, each egg in a separate cell immersed in a gum-like secretion. The young larvæ are like the adult, but want the wings. The pupæ have very short wings and tegmina.

The family *Mantidæ*, including all the genera and species of *Mantis*, constitutes the section *Raptoria* of the Orthopterous or Dermapterous insects, the whole of them being carnivorous, and feeding upon living insects, which they catch and hold by squeezing them between the toothed inner edges of the tibia and leg of the anterior pair of raptorial legs, like a pair of jaws, while eating them by the jaws of the mouth.

Using the four simple hinder legs for walking, all the kinds of *Mantis* have the singular habit of raising the extraordinarily long, slender prothorax at a considerable angle with the rest of the body,

and holding up the two great raptorial anterior pair of legs in an attitude like that of human prayer, remaining motionless, as if praying, for hours ; attracting the sympathetic respect of religious people, in the more ignorant ages, of Europe and among the Mahomedans of our own time, and being worshipped by the Hottentots. The name of praying Mantis, or Soothsayer, is popularly given to them in ignorance of their really cruel, stealthy, rapacious habits. The "raptorial legs" are curiously unlike those of any other insects, and resemble jaws with sharp teeth when in action ; they are much thicker and more muscular than the two hinder pairs of legs ; the coxæ are very long, and the trochanters short and triangular ; the femora thick, and with a deep channel on the terminal half of the under-side, the two edges of which are set with long, sharp, tooth-like spines ; the tibiæ are short, curved, compressed, and set with a row of tooth-like spines on under edge, ending in a curved sharp point, the whole fitting into the channel between the two rows of teeth in the femora when bent against them or closed. The tarsi are all 5-jointed and simple and slender ; the first joint nearly as long as all the rest put together. The posterior legs are moderately long and slender, and formed for walking.

The name Mantis is, not only from the prophet-like customary attitude, but an allusion to their long emaciated forms ; Theocritus being so injudicious as to see a resemblance between them and a thin young girl with long skinny arms—"Præmacram ac pretenuem puellam, *μαντιν*."

The *Mantidæ* are often confounded with the leaf-eating *Phasmæ* (of which examples are figured on our Plates 69, 70, and 79 of Decades VII. and VIII.), from which they differ in the raptorial anterior legs, carnivorous habits, and many points of structure. They wait motionless on trees and shrubs for the approach of smaller insects, which they suddenly snap up in the bend of their raptorial fore-legs, tearing them voraciously with their mandibles.

This is one of the large and rarer species of Mantis, although the first described of the Australian kinds. It is remarkable not

only for the width of the articulated styles at the end of the abdomen of both sexes, but for the shortness of the elytra and wings in the female. There is little or no difference in the length of the male and female individuals; but the males are perceptibly more slender in body, head, and raptorial fore-legs. There is another species with equally wide styles and of the same size, but having the much longer elytra of the female with the proportion to total length of $\frac{40}{100}$, distinguished also by the whole of the elytra being of the same brown color, imperfect transparency, and coarse veins of the anterior margin, for which the name *Mantis fusci-elytris* might be suggested. The two small dark spots on the elytra of *M. latistylus* are more frequently absent than present, and in some of our specimens there is one on one side and two on the other.

This curious Mantis has not been figured before.

Explanation of Figures.

Plate 130.—Fig. 1, male, natural size (the elytra curled up spirally by drying while the artist was lithographing the figure). Fig. 1*a*, front view of head, magnified three diameters. Fig. 1*b*, upper lip, magnified three diameters. Fig. 1*c*, mandible, magnified three diameters. Fig. 1*d*, maxilla and palpi, magnified three diameters. Fig. 1*e*, lower lip, with palpi, magnified three diameters. Fig. 1*f*, anterior or raptorial arm, viewed from the side, magnified two diameters. Fig. 1*g*, ambulatory leg, magnified two diameters. Fig. 1*h*, tarsus, side view, magnified three diameters. Fig. 1*i*, same, viewed from below. Fig. 1*k*, end of abdomen of male, with appendages and styles, viewed from above, magnified two diameters. Fig. 1*l*, same, viewed sideways. Fig. 2, female, natural size. Fig. 2*a*, end of abdomen, viewed sideways, magnified two diameters. Fig. 2*b*, same, viewed from above.

Frederick McCoy.

CONTENTS OF DECADES.

N.B.—The originals of all the Figures are in the National Museum, Melbourne.

DECADE I.

PLATE 1.—The Black Snake (Pseudechys porphyriacus, Shaw sp.).
PLATE 2.—The Copper-head Snake (Hoplocephalus superbus, Günth.).
PLATE 3.—The Tiger Snake (Hoplocephalus curtus, Schl. sp.).
PLATE 4.—The Australian Bream (Chrysophrys Australis, Günth.).
PLATE 5.—The Spiny-sided Butterfly-Gurnard (Lepidotrigla Vanessa, Rich. sp.).
PLATE 6.—The Kumu Gurnard (Trigla Kumu, Lesson and Garn.).
PLATE 7.—The Australian Giant Earth-worm (Megascolides Australis, McCoy).
PLATE 8.—Lewin's Day-moth (Agarista Lewini, Boisd.).
The Loranthus Day-moth (Agarista Casuarinæ, Scott).
The Vine Day-moth (Agarista Glycine, Lewin sp.).
PLATE 9.—Pieris (Thyca) Harpalyce (Don. sp.).
PLATE 10.—Pieris (Thyca) Aganippe (Don. sp.).

DECADE II.

PLATE 11.—The Little Whip Snake (Hoplocephalus flagellum, McCoy). The White-lipped Snake (Hoplocephalus coronoides, Günth.).
PLATE 12.—The Death Adder (Acanthophis Antarctica, Shaw sp.).
PLATE 13.—The Carpet Snake (Morelia variegata, Gray).
PLATE 14.—The Gippsland Perch (Lates colonorum, Günth.).
PLATE 15.—The Murray Lobster (Astacoides serratus, Shaw sp.).
PLATE 16.—The Salmon Arripis (Arripis truttaceus, Cuv. sp.). Adult.
PLATE 17.—Ditto of the younger forms and coloring.
PLATE 18.—The Horse Mackerel (Trachurus trachurus, Lin. sp.).
PLATE 19.—The Small-scaled Rock Cod (Lotella callarias, Günth.).
PLATE 20.—The Australian Rock Cod (Pseudophysis barbatus, Günth.).

DECADE III.

PLATE 21.—The Sea-Leopard Seal (Stenorhynchus leptonyx, de Blainv. sp.).
PLATE 22.—The Yellow-sided Dolphin (Delphinus Novæ Zealandiæ, Quoy and Gaim.).
PLATE 23.—The Common Brown Snake (Diemenia superciliosa, Fisch.).
The Small-scaled Brown Snake (Diemenia microlepidota, McCoy).
The Shield-fronted Brown Snake (Diemenia aspidorhyncha, McCoy).
PLATE 24.—Catenicella margaritacea (Busk).—C. plagiostoma (Busk)—C. ventricosa (Busk).—C. hastata (Busk.)—C. rufa (McG.).—C. cribraria (Busk).—C. alata (Wyv. Thomson).—C. lorica (Busk).—C. formosa (Busk).—C. elegans (Busk).—C. perforata (Busk).—C. Buskii (Wyv. Thomson).—C. Hannafordi (McG.).—C. crystallina (Wyv. Thomson).—C. carinata (Busk).—C. aurita (Busk).—C. geminata (Wyv. Thomson).—C. cornuta (Busk).—C. intermedia (McG.)
PLATE 25.—Membranipora membranacea (Linn. sp.).—M. perforata (McG.).—M. ciliata (McG.).—M. mamillaris (McG.).—M. umbonata (Busk).—M. pilosa (Linn. sp.).—M. cervicornis (Busk).
PLATE 26.—Membranipora dispar (McG.).—M. Woodsii (McG.).—M. lincata (Linn. sp.).—M. Rosselii (Audouin sp.).—M. Lacroixii (Savigny sp.).
PLATE 27.—The Australian Rockling (Genypterus Australis, Cast.).
The Yarra Blackfish (Gadopsis gracilis, McCoy).
PLATE 28.—The Southern Mackerel (Scomber pneumatophorus, De la Roche).
PLATE 29.—The Yabber Crayfish (Astacoides bicarinatus, Gray sp.).
PLATE 30.—The Large Wattle Goat-Moth (Zeuzera Eucalypti, Boisd. Herr.-Schæf.).

DECADE IV.

PLATE 31.—The Australian Sea-Bear or Fur-Seal (Euotaria cinerea, Péron sp.).
PLATE 32.—The Two-hooded Furina-Snake, Furina bicucullata (McCoy).
PLATE 33.—The Banded Red Gurnet-Perch (Sebastes percoides, Solander sp.).
PLATE 34.—The Angel-fish (Rhina squatina, Lin. sp.).
PLATE 35.—Lepralia circinata (McG.).—L. Cecilii (Aud.).—L. diaphana (McG.).—L. marsupium (McG.).—L. subimmersa (McG.).—L. anceps (McG.).—L. Maplestonei (McG.).
PLATE 36.—Lepralia vittata (McG.).—Membranipora perforata. Lepralia Brogniartii (Aud.).—L. elegans (McG.).—L. pertusa (Esper. sp.).—L. Malusii (Aud. sp.).—L. lunata (McG.).
PLATE 37.—Lepralia ciliata (Linn. sp.).—L. trifolium (McG.).—L. cheilodon (McG.).—L. canaliculata (McG.).—L. larvalis (McG.).—L. diadema (McG.).—L. papillifera (McG.).—L. Ellerii (McG.).
PLATE 38.—Lepralia monoceros (Busk).—L. excavata (McG.).—L. vitrea (McG.).—L. megasoma (McG.).—L. Schizostoma (McG.).—L. Botryoides (McG.).—L. ferox (McG.).—L. pellucida (McG.).
PLATE 39.—Crisia Edwardsiana (D'Orb. sp.).—C. biciliata (McG.).—C. acropora (Busk).—C. setosa (McG.).—C. tenuis (McG.).
PLATE 40.—Saunders' Case-Moth (Metura elongata, Saunders sp.).
The Lictor Case-Moth (Entometa ignobilis, Walk.).

DECADE V.

PLATE 41.—The Lace Lizard (Hydrosaurus varius, Shaw sp.).
PLATE 42.—The Spotted Marsh-Frog (Limnodynastes Tasmaniensis, Günth.).—The Common Sand-Frog (Limnodynastes dorsalis, Gray).
PLATE 43.—The Carpet Shark (Crossorhinus barbatus, Lin. sp.).—The Seven-gilled Shark (Notidanus [Heptanchus] Indicus, Cuv.).
PLATE 44.—The Barracouta (Thersites atun, Cuv.).—The Tunny (Thynnus Thynnus, Lin. sp.).
PLATE 45.—Flustra denticulata (Busk).—Carbasea episcopalis (Busk).—C. dissimilis (Busk).—C. indivisa (Busk).—C. elegans (Busk).—C. pisciformis (Busk).
PLATE 46.—Spiralaria florea (Busk).—Diachoris Magellanica (Busk).—D. spinigera (P. McGil.).—Dimetopia spicata (Busk).—D. cornuta (Busk).—Didymia simplex (Busk).—Calwellia bicornis (Wyv. Thomson).
PLATE 47.—Dictyopora cellulosa (P. McGil.).
PLATE 48.—Eschara obliqua (P. McGil.).—E. dispar (P. McGil).—E. gracilis (Lamx.).—E. platalea (Busk).—E. quadrata (P. McGil.)—E. mucronata (P. McGil.).—Caleschara denticulata (P. McGil.).
PLATE 49.—Cellaria fistulosa (Linn.).—C. hirsuta (P. McGil.).—C. tenuirostris (Busk.).—C. gracilis (Busk).—Nellia oculata (Busk).—Tubucellaria hirsuta (Busk).
PLATE 50.—The Great Black, or Manna Cicada (Cicada mœrens, Germ.).—The Great Green Cicada (Cyclochila Australasiæ, Donov. sp.).

DECADE VI.

PLATE 51.—The Victorian Rhodona (Rhodona Officeri, McCoy).
PLATE 52.—The Black and White Ringed Snake (Vermicella annulata, Gray).
PLATE 53.—The Green and Golden Bell-Frog (Ranoidea aurea, Less. sp.).
PLATES 54-55.—The Australian Aulopus (Aulopus purpurisatus, Rich.).
PLATE 56.—The Hammer-headed Shark (Zygæna malleus, Shaw).—The Common Australian Saw-Fish (Pristiophorus nudipinnis, Günth.).
PLATE 57.—Biflustra perfragilis (McGil.).—B. delicatula (Busk).
PLATE 58.—Cellularia cuspidata (Busk).—Menipea crystallina (Gray sp.).—M. cyathus (Wyv. Thomson).—M. cervicornis (McGil.)—M. tricellata (Busk).—M. Buskii (Wyv. Thomson).
PLATE 59.—Bicellaria tuba (Busk).—B. grandis (Busk).—B. ciliata (Linn).—B. turbinata (McGil.).—Stirparia annulata (Map.).—Bugula neritina (Linn.).
PLATE 60.—Steganoporella magnilabris (Busk. sp.).—Petralia undata (McGil.).

DECADE VII.

PLATE 61.—The Tuberculated Argonaut (Argonauta oryzata, Meusch.).
PLATE 62.—The same seated in its so-called shell or Paper-Nautilus.
PLATE 63.—The Blue-spotted Eagle-Ray (Myliobatis Australis, Macleay).
PLATE 64.—The Long-toothed Bull-Shark (Odontaspis taurus, Raf.).—The Australian Tope Shark (Galeus Australis, Macleay).
PLATE 65.—The Leafy Sea-Dragon (Phyllopteryx foliatus, Shaw sp.).—The Short-headed Sea-horse (Hippocampus breviceps, Pet.)
PLATE 66.—Dictyopora grisea (Lamx. sp.).—D. albida (Kirch.)—(Var. avicularis, P. McGill.).
PLATE 67.—D. Wilsoni (P. McGill.).
PLATE 68.—Idmonea Milneana (d'Orb.).—I. contorta (P. McGill.).—I. radians (Lamk.).
PLATES 69–70.—The Violet-shouldered Phasma (Tropidoderus iodomus, McCoy).—The Red-shouldered Phasma (Tropidoderus rhodomus, McCoy).

DECADE VIII.

PLATE 71.—The Australian Sea-Bear or Fur-Seal (Euotaria cinerea, Péron sp.).
PLATE 72.—The Northern Blue-tongued Lizard (Cyclodus gigas, Bodd. sp.).
PLATE 73.—The Ludrick (Girella simplex, Rich. sp.).
PLATE 74.—The White Shark (Carcharodon Rondeletii, Müll. and Hen.).
PLATE 75.—The Picked Dog-Fish (Acanthias vulgaris, Linn. sp.).
PLATES 76–77.—The Australian Tooth-cupped Cuttlefish (Sepioteuthis Australis, Quoy and Gaim.).
PLATE 78.—Bugula robusta (P. McGil.).—B. cucullata (Busk).—B. dentata (Lamx.).—B. avicularia (Pall.).
PLATE 79.—The Violet-winged Phasma (Acrophylla violascens, Leach sp.).
PLATE 80.—The Large Pink-winged Phasma (Podacanthus typhon, Gray).

DECADE IX.

PLATE 81.—The Gippsland Water Lizard (Physignathus Lesueri, Gray)—(Var. Howitti, McCoy).
PLATES 82–83.—The Murray Tortoise (Chelymys Macquaria, Cuv. sp.).
PLATE 84.—The Murray Golden Perch (Ctenolates ambiguus, Rich. sp.).
PLATES 85–86.—The Murray Cod-Perch (Oligorus Macquariensis, Cuv. and Val. sp.).
PLATE 87.—The Australian Smooth-Hound (Mustelus Antarcticus, Günth.).
PLATE 88.—The Thresher, or Long-tailed Shark (Alopecias vulpes, Linn. sp.).
PLATE 89.—Catenicella intermedia (P. McG.).—C. amphora (Busk).—C. Wilsoni (P. McG.).—C. pulchella (Map.).—C. utriculus (P. McG.).
PLATE 90.—Catenicella fusca (P. McG.).—C. umbonata (Busk).—C. cornuta (Busk).

DECADE X.

PLATE 91.—Gymnobelideus Leadbeateri (McCoy).
PLATES 92–93.—The Long-necked River Tortoise (Chelodina longicollis, Shaw sp.).
PLATE 94.—Opercula of Retepora.
PLATE 95.—Retepora porcellana (P. McGil.).—R. avicularis (P. McGil.).—R. fissa (P. McGil.).
PLATE 96.—Retepora monilifera (P. McGil.).
PLATE 97.—Retepora monilifera (P. McGil.).—R. formosa (P. McGil.).—R. carinata (P. McGil.).
PLATE 98.—Retepora Phœnicea (Busk).—R. aurantiaca (P. McGil.).
PLATE 99.—Retepora granulata (P. McGil.).—R. tessellata (Hincks).—R. serrata (P. McGil.).
PLATE 100.—Goniocidaris tubaria (Lam.).

The foregoing ten Decades form Vol. I.

DECADE XI.

PLATE 101.—The Luth, or Leathery Turtle (Sphargis coriacea, Linn. sp.).
PLATE 102.—The Rugged Stump-tail, or Shingle-back, Lizard (Trachydosaurus rugosus, Gray).
PLATE 103.—The Blackish Australian Worm-Snake (Typhlops nigrescens, Gray sp.).
PLATE 104.—The Basking Shark (Cetorhinus maximus, Linn. sp.).
PLATE 105.—Cellaria rigida (McG.).—Tubucellaria cereoides (Ellis and Solander).—Urceolipora dentata (McG.)—U. nana (McG.).
PLATE 106.—Amphiblestrum punctigerum (Hincks). — A. Flemingii (Busk). — A. permunitum (Hincks).—Pyripora crassa (McG.).—P. catenularia (Jameson).—P. polita (Hincks).—Electra flagellum (McG.). — Bathypora porcellana (McG.).—Biflustra papulifera (McG.).—B. bimamillata (McG.).
PLATE 107.—Catenicellopsis pusilla (J. B. Wilson). — C. delicatula (J. B. Wilson). — Calpidium ponderosum (Goldstein sp.).
PLATE 108.—Calpidium ornatum (Busk).—Chlidonia dædala (Wyv. Thomson).
PLATE 109.—The Great Green Gum-tree Grasshopper (Locusta vigentissima, Serv.).
PLATE 110.—The Australian Yellow-winged Locust (Œdipoda musica, Fab. sp.).

DECADE XII.

PLATE 111.—The Blood-sucker (Grammatophora muricata, Shaw, sp.).
PLATE 112.—The Southern Chimæra (Callorhynchus antarcticus, Lacép. sp.).
PLATE 113.—The Port Jackson Shark, or Bull-dog Shark (Heterodontus Phillipi, Lacép. sp.).
PLATE 114.—The Australian Rough Fish (Trachichthys Australis, Shaw).
PLATE 115.—The Skip-jack Pike (Lanioperca mordax, Günth.).
PLATE 116.—Beania mirabilis (Johnst.).—Mucronella tricuspis (Hincks).—M. lævis (P. McG.).—M. vultur (Hincks).—Cyclicopora longipora (P. McG.).
PLATE 117.—Beania decumbens (P. McG.). — B. costata (Busk sp.). — B. Crotali (Busk sp.). — B. radicifera (Hincks sp.).—Amphiblestrum patellarium (Moll sp.).
PLATE 118.—Hornera foliacea (P. McG.).—H. robusta (P. McG.).
PLATE 119.—The Smaller Green Gum-tree Grasshopper (Phaneroptera valida, Walk.).
PLATE 120.—The Thirty-two Spotted Grasshopper (Phaneroptera [Ephippitytha] trigintiduoguttata, Serv.).

DECADE XIII.

PLATE 121.—The Bearded Lizard (Grammatophora barbata, Kaup).
PLATE 122.—The Southern Silver Ribbon-fish (Trachypterus tænia, Bloch).
PLATE 123.—The Two-pronged Toad-fish (Chironectes bifurcatus, McCoy).
PLATE 124.—Brown's Tooth-brush Leather-jacket (Monacauthus Browni, Rich, sp.).
PLATE 125.—The Horse-shoe-marked Leather-jacket (Monacanthus hippocrepis, Quoy and Gaim., sp.).
PLATE 126.—Maplestonia cirrata (P. McG.).—Scrupocellaria cyclostoma (Busk).—S. obtecta (Haswell).—S. cervicornis (Busk).—S. scrupea (Busk).—S. ornithorhynchus (Wyv. Thom.).
PLATE 127.—Membranipora pyrula (Hincks).—M. corbula (Hincks).—M. inarmata (Hincks).—M. pectinata (P. McG.).—M. serrata (P. McG.).—M. ciliata (P. McG.).—Amphiblestrum albispinum (P. McG.).—Membranipora spinosa (Quoy and Gaim.).
PLATE 128.—Cellepora speciosa (P. McG.).—C. serratirostris (P. McG.).—C. tridenticulata (Busk).
PLATE 129.—The Netted Acripeza (Acripeza reticulata, Guérin).
PLATE 130.—The Broad-styled Mantis (Mantis latistylus, Serv.).

CONTENTS OF DECADE XIII.

N.B.—The originals of all the Figures are in the National Museum, Melbourne.

PLATE 121.—The Bearded Lizard (Grammatophora barbata, Kaup).

PLATE 122.—The Southern Silver Ribbon-fish (Trachypterus tœnia, Bloch).

PLATE 123.—The Two-pronged Toad-fish (Chironectes bifurcatus, McCoy).

PLATE 124.—Brown's Tooth-brush Leather-jacket (Monacanthus Browni, Rich, sp.).

PLATE 125.—The Horse-shoe-marked Leather-jacket (Monacanthus hippocrepis, Quoy and Gaim., sp.).

PLATE 126.—Maplestonia cirrata (P. McG.).—Scrupocellaria cyclostoma (Busk).—S. obtecta (Haswell).—S. cervicornis (Busk).—S. scrupea (Busk).—S. ornithorhynchus (Wyv. Thom.).

PLATE 127.—Membranipora pyrula (Hincks).—M. corbula (Hincks).—M. inarmata (Hincks).—M. pectinata (P. McG.).—M. serrata (P. McG.).—M. ciliata (P. McG.).—Amphiblestrum albispinum (P. McG.).—Membranipora spinosa (Quoy and Gaim.).

PLATE 128.—Cellepora speciosa (P. McG.).—C. serratirostris (P. McG.).—C. tridenticulata (Busk).

PLATE 129.—The Netted Acripeza (Acripeza reticulata, Guérin).

PLATE 130.—The Broad-styled Mantis (Mantis latistylus, Serv.).

MARY E. ROGICK

Natural History of Victoria.

PRODROMUS

OF THE

ZOOLOGY OF VICTORIA;

OR,

FIGURES AND DESCRIPTIONS OF THE LIVING SPECIES OF ALL CLASSES

OF THE

VICTORIAN INDIGENOUS ANIMALS.

DECADE XIV.

BY

FREDERICK McCOY, C.M.G.; Sc. D. CANTAB., F.R.S.,

HONORARY MEMBER OF THE CAMBRIDGE PHILOSOPHICAL SOCIETY; HONORARY ACTIVE MEMBER OF THE IMPERIAL SOCIETY OF NATURALISTS OF MOSCOW; CORRESPONDING MEMBER OF THE ZOOLOGICAL SOCIETY OF LONDON; HONORARY MEMBER OF THE ROYAL SOCIETY OF NEW SOUTH WALES; HONORARY FELLOW OF THE GEOLOGICAL SOCIETY OF EDINBURGH; HONORARY MEMBER OF THE GEOLOGICAL SOCIETY OF MANCHESTER,
ETC., ETC., ETC.
AUTHOR OF "SYNOPSIS OF THE CARBONIFEROUS LIMESTONE FOSSILS OF IRELAND;" "SYNOPSIS OF THE SILURIAN FOSSILS OF IRELAND;" "CONTRIBUTIONS TO BRITISH PALÆONTOLOGY;" ONE OF THE AUTHORS OF SEDGWICK AND McCOY'S "BRITISH PALÆOZOIC ROCKS AND FOSSILS;" "PRODROMUS OF THE PALÆONTOLOGY OF VICTORIA," ETC.

PROFESSOR OF NATURAL SCIENCE IN THE MELBOURNE UNIVERSITY.
GOVERNMENT PALÆONTOLOGIST, AND DIRECTOR OF THE NATIONAL MUSEUM OF MELBOURNE, ETC.

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ADVERTISEMENT.

It having been considered desirable to ascertain accurately the natural productions of the Colony of Victoria, and to publish works descriptive of them, on the plan of those issued by the Governments of the different States of America, investigations were undertaken, by order of the Victorian Government, to determine the Geology, Botany, and Zoology of the Colony, to form collections illustrative of each for the public use, and to make the necessary preparations for such systematic publications on the subject as might be useful and interesting to the general public, and contribute to the advancement of science.

As the geological and botanical investigations have already approached completion, and their publication is far advanced, it has been decided now to commence the publication of the third branch completing the subject, namely, that of the Zoology or indigenous members of the different classes of the animal kingdom.

The Fauna not being so well known as the Flora, it was a necessary preliminary to the publication to have a large number of drawings made, as opportunity arose, from the living or fresh examples of many species of reptiles, fish, and the lower animals, which lose their natural appearance shortly after death, and the true characters of many of which were consequently as yet unknown, as they had only been described from preserved specimens. A Prodromus, or preliminary issue, in the form of Decades, or numbers of ten plates, each with its complete descriptive letterpress, will be published, of such illustrations as are ready, without systematic order or waiting for the completion of any one branch. The many good observers in the country will thus have the means of accurately identifying various natural objects, their observations on which, if recorded and sent to the National Museum, where the originals of all the figures and descriptions are preserved, will be duly acknowledged, and will materially help in the preparation of the final systematic volume to be published for each class when it approaches completion.

Natural History of Victoria.

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M DCCC LXXXVII.

PREFACE.

—o—

This fourteenth Decade gives detailed figures, on the first plate, No. 131, of the large species of Blue-tongued Lizard, *Cyclodus nigroluteus*, found near Melbourne and generally in the southern portions of the colony, where it replaces the *Cyclodus gigas*, another Blue-tongued Lizard (previously figured on Plate 72), of the warmer more northern localities.

The second plate, No. 132, gives figures with details of structure of two of the curious nocturnal climbing Lizards called Geckoes; one illustrating the group with retractile sheathed claws and dilated toes; the other belonging to the slender-toed group with non-retractile claws, without sheath.

The third plate illustrates another of the species of English Fish sometimes occurring, though very rarely, in our waters, the Ray's Bream; one of those famed as a delicacy by the European gourmand, and which appeared for the first time on the Victorian coast at Portland in great numbers in April, 1884, not having been seen by our fishermen before or since.

Plate 134 gives a figure of one of the numerous beautiful "Parrot-fishes" of the colony, the *Labrichthys Bleekeri*, not figured before.

The fifth plate illustrates the Sea Gar-fish, or Half-beak, of our coasts; and the Saury Pike, of the variety usually called *Scomberesox Forsteri*, although I doubt its distinction from the European Saury Pike, *S. saurus*.

The next three plates continue the illustrations of Victorian Polyzoa, for the specimens and descriptions of which I am indebted to Mr. MacGillivray.

The following plate, No. 139, gives figures for the first time of our commonest solitary Locust of the flat-horned group, the *Opsomala sordida;* and also of a Locust, entirely wingless in the adult state of both sexes, the *Mesops pedestris*, remarkable for having the eye in the middle of the side of a long conical head, far from the antennæ.

The last plate illustrates in full detail our commonest species of the division of Keel-backed Locusts, having the thorax compressed into a thin prominent keel, the *Tropinotus Australis*.

The succeeding Decades will illustrate as many different genera as possible, and will deal first, usually, with species of some special interest, and of which good figures do not exist or are not easily accessible.

Frederick McCoy.

20th May, 1887.

D^r Wild del et lith

Prof^r M^cCoy direct^r

Steam Litho. Govt. Printing Office

PLATE 131.

CYCLODUS NIGROLUTEUS (QUOY AND GAIM. SP.).

THE SOUTHERN, OR BLOTCHED, BLUE-TONGUED LIZARD.

[Genus CYCLODUS (WAGLER). (Sub-kingdom Vertebrata. Class Reptilia. Order Sauria. Sub-order Leptoglossæ. Tribe Geissosaura. Family Scincidæ.)

Gen. Char.—Form moderately thick, elongate, fusiform. Head large, thick, sub-trigonal, obtusely pointed in front. Neck short, thick. Head-shields thick, rather rugose; nasal plates near the tip of snout, touching (or nearly) each other above, ovato-trigonal; nostril in centre of nasal plate, with a curved furrow bordering its posterior edge*; inter-nasal plate rhombic; no supra nasals; fronto-nasals two, moderate, touching; frontal large, broad, obtuse-angled in front, narrow behind; two moderately large fronto-parietal plates; parietals large; inter-parietal resembling the frontal, and nearly as long, but much narrower, acute-angled in front; four superciliary plates over each eye, the second largest; about 5 rows of temporal plates between the eye and the ear; polygonal occipital shields in one or more transverse rows; orbit surrounded by a row of small plates; two frenal plates between the nasal plate and the orbit; lower eyelid scaly. Ear-opening large. Scales of back and sides bony, large, convex, sub-hexagonal, rugose, with obscure, diverging grooves; scales of belly thinner and smoother. Legs four, nearly equal, small, short, strong; feet small, each with five short, cylindrical, sub-equal toes; claws short, thick. Tail short, rather less than one-third of the total length, sub-cylindrical, very slightly compressed laterally, tapering, with rather thicker scales than the back of the body, and a central row of large, broad scales below. Tongue short, flat, scaly, slightly notched at the point. Teeth on edge of jaws bluntly rounded; palate without teeth, with a triangular notch behind.]

DESCRIPTION.—*Form:* Moderately elongate, rounded; head trigonal; snout obtusely pointed; neck short. *Plates:* Nasals nearly touching over tip of rostral, a curved sulcus bordering posterior edge of nostril; the four temporal plates immediately behind the rows of ocular plates surrounding the eye, from the parietal plates above to the hindmost labial plate below, less than half the length of the temporal plates next following them posteriorly; rostral plate wider than long; inter-nasal plate slightly longer than wide; width of anterior part of frontal plate about three-fourths of the length; anterior edge of ear dentated with a few projecting scales. *Colour:* Ground colour of whole body and head above and below rich, dull yellow with blackish-brown longitudinal dashes, leaving the yellow in the form of two longitudinal rows of about five to seven large, irregular, rounded patches extending from the neck to the base of tail; tail irregularly ringed with about five yellow bands about three or four scales wide, and five or six blackish-brown rings about two or three scales wide; throat unspotted pale yellow; sides and belly irregularly netted with longitudinal black dashes on the yellow ground; a few transverse dark dashes on the hind legs; tongue bright Prussian blue.

MEASUREMENTS.

	Feet.	ins.	lines.
Total length of rather large specimen	1	3	6
Length of head from snout to anterior edge of ear	0	2	9
Length of inter-nasal plate...	0	0	$4\frac{1}{2}$
Width „ „ „	0	0	5
Length of frontal plate	0	0	5

* Except in *C. casuarinæ*, now the type of the genus *Omolepida*.

MEASUREMENTS—*continued.*

	Ft.	ins.	lines.
Greatest width of frontal plate	0	0	$3\frac{2}{3}$
Length of inter-parietal	0	0	4
Greatest width of inter-parietal	0	0	$2\frac{1}{2}$
Height of rostral plate	0	0	3
Width „ „	0	0	4
Diameter of ear	0	0	$2\frac{1}{2}$
Length from tip of snout to anterior edge of shoulder ...	0	2	10
„ of anterior limb to tip of longest claw	0	1	7
„ of longest toe and claw	0	0	4
„ from anterior edge of shoulder to anterior edge of thigh	0	6	9
„ of hind limb to extremity of longest claw	0	1	9
„ of tail	0	4	5
Girth round middle of body	0	6	0
Number of transverse rows of scales in 1 inch at middle of back		Four.	
„ „ longitudinal „ „ „ „		Five.	

REFERENCE.=*Scincus nigroluteus,* Quoy & Gaimard, Voy. Uran., Rept. t. 41 = *Cyclodus* id. Wagler Syst. Amph., p. 162.

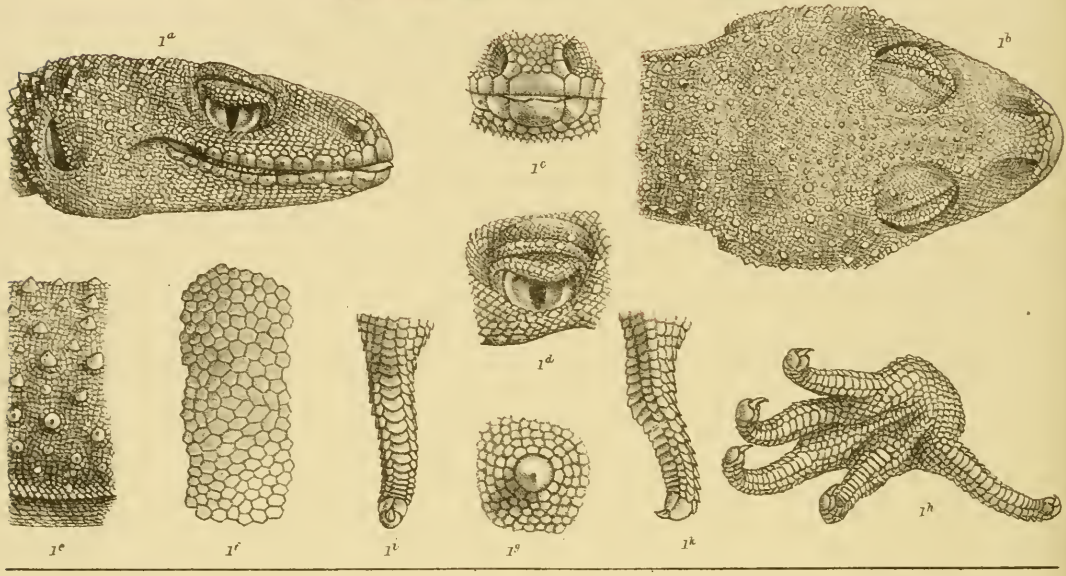
This species is very like the *C. gigas* (Bod.), figured in our Plate 72, but is readily distinguished by the shortness of the first, or most anterior, row of the temporal plates behind the posterior oculars, as compared with the much greater length of the next succeeding ones, while in *C. gigas* the anterior ones are double the length of the next posterior ones. It is also distinguished by the longitudinal rows of large, rounded, light blotches of yellow, instead of the more numerous, irregular, transverse, alternately dark and light bands of the former species.

Not uncommon about Melbourne, where it is generally called "Blue-tongued Lizard," or "Sleepy Lizard." When kept in confinement it feeds on bread and milk, lapping the milk readily.

EXPLANATION OF FIGURES.

PLATE 131.—Fig. 1, average specimen, half the natural size. Fig. 1*a*, outline of plates of top of head, half the natural size. Fig. 1*b*, outline of plates of side of head, half the natural size, showing the characteristic shortness of first row of plates behind the posterior sub-orbitals. Fig. 1*c*, two plates of back, natural size.

FREDERICK McCOY.



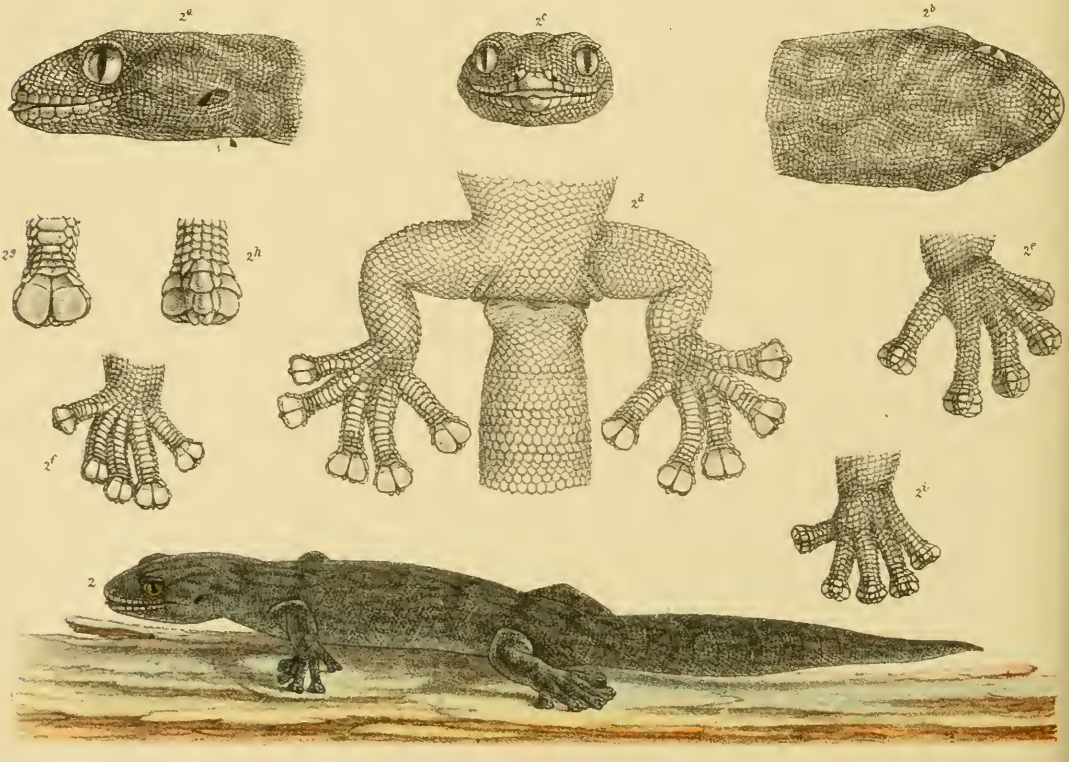


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PLATE 132, FIG. 1.

PHYLLURUS MILIUSII (BORY).

THE THICK-TAILED GECKO.

[Genus PHYLLURUS (CUV.). (Sub-kingdom Vertebrata. Class Reptilia. Order Sauria. Sub-order Pachyglossæ. Tribe Nyctisaura. Fam. Geckotidæ).

Gen. Char.—Head trigonal, broad behind; one small, quadrate chin-plate; neck narrow; body moderately broad, moderately depressed; tail cordate, trigonal, thick, broad, and depressed near base, tapering rapidly to posterior end, which is conical; base constricted, very narrow. Legs long, slender: toes all with non-retractile claws, elongate, slender, compressed; sides not serrated; joints bent at right angles to each other, the base slightly thickened below with distinct transverse plates; outer hind toe versatile (at right angles to the others). Sides of body with a slightly prominent fold of skin from base of arm to base of thigh. Scales minute, granular, with scattered conical tubercles on upper surface. No femoral nor preanal pores. Eyes nocturnal, with linear, erect pupil; upper eye-lid large, lower one very small.]

DESCRIPTION.—Head short, thick, flattened, trigonal, wide behind; an oval depression open behind on top of head, bordered by larger granules; space between the eyes half the diameter of the orbit; rostral plate sub-hexagonal, 3 times wider than high; width about equalling $2\frac{1}{2}$ of next labial plates; upper lateral side of rostral bears a small plate, on outer edge of which is the round nostril over first labial; chin-plate slightly less wide, but deeper, than the rostral; no plates under the chin, nor behind the nostrils. Under eye-lid very short, not covering cornea; upper very large, forming two parallel folds round the upper half of eye; pupil elliptical, vertical. Ear-opening oval. Neck and body narrow. Legs slender; toes slender, nearly cylindrical, arched at the end, one row of transverse plates below each; claws very short. Tail very narrow at base, then suddenly broad, thick, cordate, with scattered conical tubercles above; sides rounded and slightly tubercular, then tapering quickly and becoming round in section, and tapering to a fine point at posterior end. *Scales:* Entire surface of head, body, limbs, and tail, above and below, covered with close, extremely minute, rounded granules, with larger conical tubercles scattered on the upper surface; the larger tubercles on the head blunter and smaller than on the body. Labial plates, $\frac{12}{12}$; no plate between the nostrils. *Color:* Upper side of body marron or chestnut-brown, tail darker chocolate, with several narrow white cross bands, 2 or 3 on neck, and 4 or 5 on tail, and transverse rows of white spots on back, smaller white spots on upper surface of legs; under surface of throat, body, legs, and tail plain greyish-white. *Measurements:* Average total length from tip of snout to end of tail, $5\frac{1}{2}$ inches. Proportional measurements (to total length as 100): Length of head, $\frac{22}{100}$; width of head behind, $\frac{16}{100}$; width of neck, $\frac{9}{100}$; width of middle of body, $\frac{15}{100}$; length of tail, $\frac{39}{100}$; width of tail at base, $\frac{6}{100}$; at middle of dilated portion, $\frac{15}{100}$; at base of slender posterior half, $\frac{5}{100}$; length of dilated portion, $\frac{20}{100}$; depth of head, $\frac{11}{100}$; diameter of eye, $\frac{2\frac{1}{2}}{100}$; from tip of snout to anterior edge of eye, $\frac{10}{100}$; to ear, $\frac{20}{100}$; to shoulder, $\frac{28}{100}$; to front of thigh, $\frac{52}{100}$; from shoulder to tip of fingers, $\frac{28}{100}$; length of longest finger, $\frac{5}{100}$; from hip to end of longest toe, $\frac{33}{100}$; length of longest toe, $\frac{7\frac{1}{2}}{100}$.

REFERENCE.—Bory de Saint-Vincent, Dict. Class. d'Hist. Nat., v. 7, p. 183, t. not numbered, fig. 1.

The Geckoes form one of the most peculiar divisions of the saurian reptiles. They are all small disagreeable-looking Lizards, inhabiting warm countries, and are nocturnal in their habits, catching insects, especially caterpillars and other larvæ, and worms, on which they feed by night; and hiding under the bark of trees and in other crevices by day, and especially shunning the glare of the sun, in which the other kinds of Lizards delight. They have a wide, flat head, narrow neck, the body always depressed, or flattened from above downwards, broadest in the middle, and never have any median crest on the body or tail. The legs are strong, the feet short, with the toes rather short and nearly equal in length, usually furnished with sharp, retractile claws, like those of a cat, for climbing the bark of trees, and generally furnished with transverse membranous plates below, recalling the structure of the foot of a fly, and enabling them to run up smooth surfaces, such as a perpendicular wall of a house, or on the ceiling of a room, with great swiftness, darting on the flies and other insects, which it can only catch with its jaws, by pouncing upon them and swallowing them whole, the œsophagus or gullet being unusually large, to allow of this mode of feeding, and the articulation of the lower jaw being far behind the head, as in the crocodiles, to form a large gape. The structure of the tongue is a distinguishing peculiarity of the whole group, being short, thick, fleshy, blunt, and slightly notched in front, which is free, but with very slight powers of protrusion, contrasting strongly with the Monitors, for instance (see Plate 41, Decade V.). Like most nocturnal animals, the eyes are very large, and the pupil usually vertical and elliptical, with fringed edge; the eye-lids are continuous, like those of a chameleon, the under one very small, and the upper very large, and a transverse winking one moving transversely between them.

They are remarkable for uttering a sharp, loud cry or click, in some species like the word "Geck-o," from which their name arises.

The skin seems soft and almost naked, from the minuteness and granular character of the scales, the head being destitute of conspicuous plates, unlike most Lizards. The tail is less than the body in length, and so brittle that it falls off even from a slight jar or

sudden awkward movement from fright; the new tail, which soon replaces the lost one, is generally slightly different in size, color, and scaling from the original, and must not be mistaken for a new specific character; it is generally depressed, often fusiform, and sometimes flattened and dilated. The teeth are confined to the jaws, and are "pleurodont," or ranged in a channel in each jaw, and only fixed to the outer parapet of bone by the side or external face of the root; they are close, nearly equal, compressed, and sharp-pointed.

The males are smaller, more slender, and more agile, and more brightly colored than the females.

The brown and grey mottled colors of most of the species vary a good deal at will, to assimilate to the tint and style of coloring of the bark, &c., on which they rest, and from which only the brilliancy of their eyes distinguishes them. Their movements are sudden, and surprisingly swift and noiseless.

The various genera of Geckoes form two groups, the one with the toes more or less dilated, and having retractile claws, hooked, and lodged in a sheath when withdrawn; the other with slender toes and simple, non-retractile claws, not hooked, and with no sheath; and of these two groups our plate gives an example of each.

The present species, *P. Miliusii*, is one of the most striking Geckoes of the slender-toed group, having the toes bent nearly at right angles with each joint, giving them the appearance of having been broken or deformed. The broad, thick, heart-shaped tail, and beautiful, transverse, dark and light banding of the color of the upper surface, render this one of the most striking Lizards of the northern warm parts of the colony. It is rarely found south of Sandhurst.

Explanation of Figures.

Plate 132.—Fig. 1, average specimen, natural size, seen from above. Fig. 1*a*, side view of head, magnified two diameters. Fig. 1*b*, top view of head, magnified two diameters. Fig. 1*c*, front view of snout, to show rostral, chin, and anterior labial, plates, with the plate at anterior inner edge of each nostril, and the granules between the nostrils; magnified two diameters. Fig. 1*d*, eye and eye-lids, magnified two diameters. Fig. 1*e*, portion of back and side, magnified two diameters, showing the conical tubercles amongst the granular scales of back, the prominent lateral ridge or fold, and the smooth belly scales. Fig. 1*f*, smooth scales of belly, magnified two diameters. Fig. 1*g*, conical tubercle of back, with surrounding small granular scales, magnified six diameters. Fig. 1*h*, under-side of foot, showing transverse scaling and projecting claws, magnified three diameters. Fig. 1*i*, one of the toes, magnified four diameters, viewed from below, to show scaling. Fig. 1*k*, ditto, viewed from the side.

PLATE 132, FIG. 2.

DIPLODACTYLUS MARMORATUS (GRAY).

THE MARBLED GECKO.

[Genus DIPLODACTYLUS (GRAY). (Sub-kingdom Vertebrata. Class Reptilia. Order Sauria. Sub-order Pachyglossæ. Tribe Nyctisaura. Family Geckotidæ.)

Gen. Char.—Head, body, and tail moderately elongate, rounded, depressed; tail conical or fusiform, round in section; scales of body and tail small, similar, and alike above and below. Toes all with claws, linear, dilated and truncated at the tip, which is formed of the penultimate joint; last joint small, inflexed in a notch between the dilated pads; under-side of each toe with one row of broad, transverse plates, ending with a pair of large, convex, oval, thick plates on the dilated tip, rounded at the distal end; hind toe of hind foot versatile. Tongue thick, short, convex, slightly notched at tip. Eyes with vertical, narrow, linear pupil; eye-lids circular, not connivent.]

DESCRIPTION.—*Form:* Head sub-pentagonal, depressed, covered with very small, sub-equal, rounded, granular scales; rostral plate large, pentagonal, with 3 plates arching from the upper side round to the first labial enclosing the nostril, which touches the first labial and upper lateral angle of the rostral plate. Eight gradually diminishing upper labials. Lower rostral plate quadrate, small, little larger than the labials, which are 8 or 9 in number, gradually diminishing from the front. Ear, a small, simple, round aperture. Eye, surrounded with a circle of small granules. Hand, with the fingers gradually enlarging to the fourth, which is longest; fifth nearly equals the second; each with a small claw hid in the notch between the dilated pair of scales, forming the tip, covered above with several rows of small scales, the last two or three increased in size; on the under-side each toe has a row of transverse plates along the middle, with two abruptly larger, quadrate, porous ones at the tip. Hind foot resembling the anterior, but larger, and having the outer or hind toe versatile or standing at right angles to the others. Whole body and tail, above and below, covered with nearly equal and similar, rhombic, granular scales. Tongue broad, thick, flat, granular, with a small notch in front. Tail nearly circular in section, slightly fusiform, perceptibly narrower at base than at one-third its length farther towards the tip. *Color:* Very pale purplish-brown above, marbled from top of head over back of body and tail, and crossed at intervals of about a quarter of an inch with very irregular, narrow, scribbled, or vermiculate darker marks irregularly undulated, and joined in imperfect, looped, and angulated patterns, often with a median row of obscure, paler, oblong, or irregular angular spots; pale, ashy, or purplish, livid-whitish below. Iris bright brown-bronze, with black irregular streaks. Inside of mouth and tongue dull yellow. Total length of average individual, 4 ins. 7 lines. Proportional measurements, (referred to length as 100): Length of head, $\frac{12}{100}$; length of gape, which reaches to middle of eye, $\frac{6\frac{1}{2}}{100}$; diameter of eye, $\frac{2}{100}$; snout to ear, $\frac{11}{100}$; neck, $\frac{8}{100}$; from snout to shoulder, $\frac{16}{100}$; fore-arm, $\frac{6}{100}$; elbow to wrist, $\frac{6}{100}$; longest (fourth) toe, $\frac{5}{100}$; front of shoulder to front of thigh, $\frac{26}{100}$; length of thigh, $\frac{8}{100}$; knee to ancle, $\frac{6}{100}$; longest (fourth) toe, $\frac{6}{100}$; snout to base of tail, $\frac{47}{100}$; length of tail, $\frac{54}{100}$; greatest width of head, $\frac{10}{100}$; greatest width of body, $\frac{10}{100}$; width of base of tail, $\frac{6}{100}$; width of tail at one-third of length from base, $\frac{8}{100}$. Number of scales about middle of back in three lines, 20.

REFERENCE.—Gray, Zool. Er. & Ter., t. 15, f. 6, Cat. B. M., Lizards, p. 149.

Like all the Geckoes, these *Diplodactyli* are small, nocturnal Lizards, with the tips of the toes generally more or less dilated. This species is a good example of those having an apparent doubling of the greatly swollen distal ends of the toes, with the terminal joint and claw so minute as to seem hid in the notch between the two large pads.

They live on insects and worms, which they swallow whole, the œsophagus being very large. The males are smaller than the females. The tails are very brittle and easily lost, and reproduced, with some slight differences, from the original in the form of the scales, &c.

This species is abundant in the northern parts of the colony, found lurking under the deciduous bark of trees in the day time, the brownish or purplish-ashy mottlings almost exactly coinciding in appearance with the bark, rendering them very difficult of detection except for the brightness of the beautiful bronze eye. Some specimens have the transverse, dark marbling more distinct, and with the light color less broken, while others have the pattern more complex. The under-side is destitute of markings in all the specimens.

The specimen figured is from Echuca. Not figured of the color of life before.

Explanation of Figures.

Plate 132.—Fig. 2, average specimen, natural size. Fig. 2*a*, side view of head, magnified two diameters. Fig. 2*b*, top view of head, magnified two diameters. Fig. 2*c*, front view of head, magnified two diameters, to show rostral, mental, and labial plates, and those between the nostrils. Fig. 2*d*, under view, showing scales of base of abdomen and tail, and under-side of hind legs, magnified two diameters. Fig. 2*e*, upper side of hind foot, magnified two diameters, to show upper scaling. Fig. 2*i*, upper side of anterior foot, magnified two diameters. Fig. 2*f*, under side of anterior foot, to show arrangement of scales with the double dilated pads at the tips, with the minute terminal joint between them. Fig. 2*g*, portion of one of the toes, magnified four diameters, to show the scales and plates near tip, viewed from below. Fig. 2*h*, ditto, viewed from above.

Frederick McCoy.

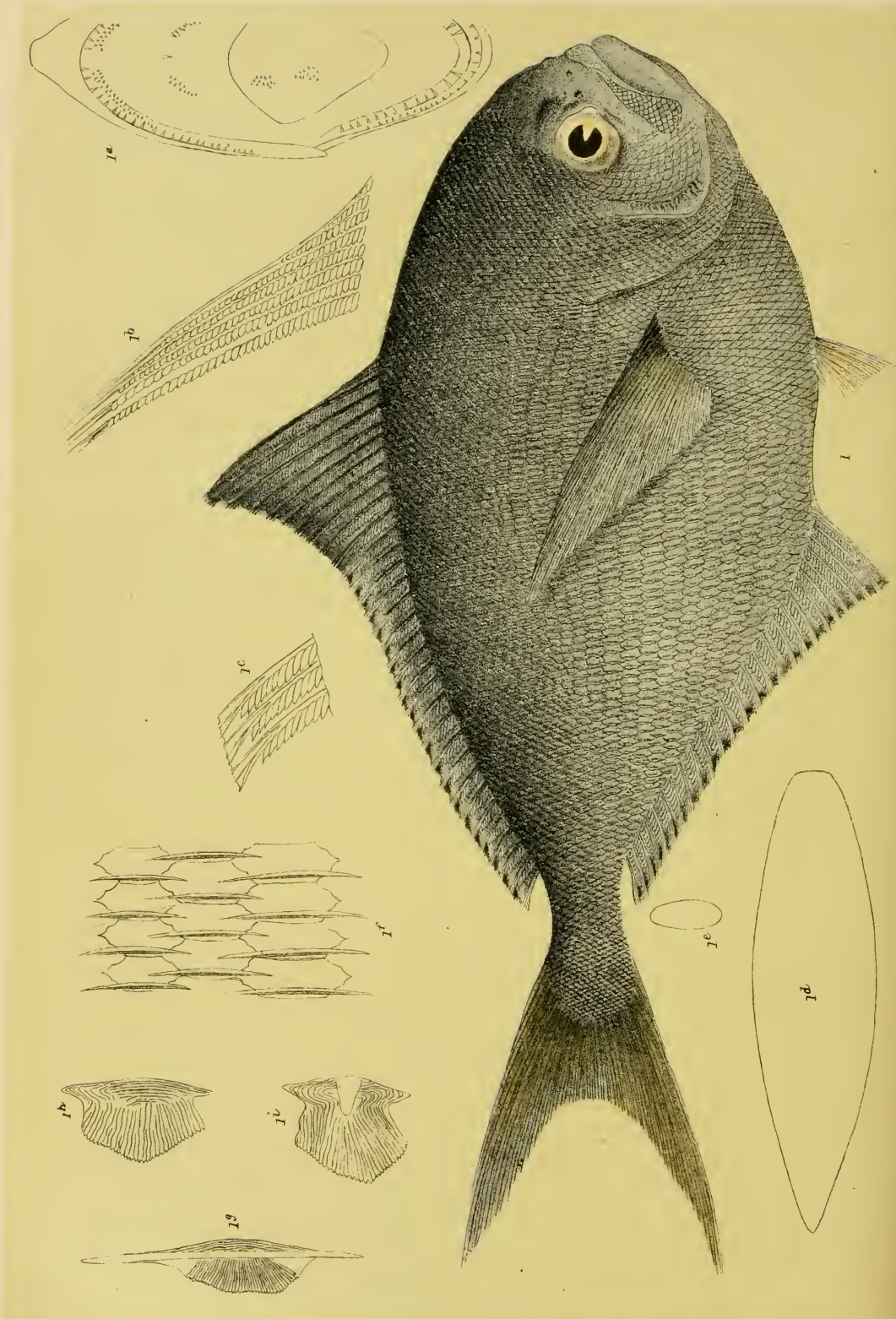

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PLATE 133.

BRAMA RAYI (BLOCH).

RAY'S SEA BREAM.

[Genus BRAMA (SCHNIDER). (Sub-kingdom Vertebrata. Class Pisces. Sub-class Teleostei. Order Acanthopterygii. Family Scomberidæ. Sub-family Coryphœninæ.)

Gen. Char.—Body ovate, elevated, much compressed laterally; scales rather small; cleft of mouth very oblique, lower jaw longest; opercular pieces with smooth entire edges; seven branchiostegal rays; teeth large, conical, one outer row on both jaws, with a few rows of minute ones at base, a few, or none, on the vomer, and a patch of small ones on each palatine bone. Dorsal fin elongate, with three or four slender spines in front, and covered with small scales; anal like dorsal, with two or three slender spines in front; caudal deeply forked; ventrals small, under pectorals, of one slender spine and five branched rays; pectoral long, pointed. No swim-bladder; about five pyloric appendages.]

D. 3+38; A. 2 . 29; P. 19; V. 1+5; C. $\frac{1}{11}^{2}$; L.L. $94\frac{15}{28}$.

DESCRIPTION.—Greatest depth of body under origin of dorsal fin, equal to $\frac{1}{3}$ the total length including caudal fin; thickness about $\frac{1}{4}$ the height. *Head* short, about $\frac{1}{5}$ of total length and about $\frac{1}{5}$ higher than long, profile from front of dorsal fin to chin forming a parabolic curve; cleft of mouth extending obliquely upwards, ending at the vertical of anterior edge of eye; lower jaw longest, with a chin-like angle below the mouth; the curve of the head and nape and the less convex one of the throat to ventral fin intersecting at the chin nearly at right angles; orbits large, midway on a vertical line from top of head to lower edge of suboperculum. *Teeth:* There are no teeth on the vomer in some specimens and 1 or 3 in others; none on the smooth fleshy tongue; one row of large, conical teeth on edge of upper jaw, with a band of small ones within; two rows of conical teeth, with a narrow band of minute ones between them, on the under jaw, the inner row largest and hooked inwards; an oblong patch of 7 or 8 small hooked teeth on each palatine bone. Gill-openings extending to middle of lower jaw at throat, their membranes there uniting and covered by a fold of skin. *Fins:* Dorsal falcately lengthened in front, posterior two-thirds low, of 3 slender spines lodged in the front edge, and 38 branched rays, covered with small scales; anal smaller than and originating a little behind the dorsal, falcately lengthened in front, hinder three-fourths low, of 2 small, slender spines in front edge and 29 branched rays, the second and third longest, rapidly shortening to the ninth, all covered with scales; pectorals long, falcately pointed, about one-third of the height above ventral edge, reaching to middle of anal, of 19 rays, the sixth and seventh longest; ventrals small, of 1 slender spine, half the length of the others, and 5 branched rays; caudal deeply forked, of about 23 rays, those of the pointed lobes nearly four times as long as those of middle. *Scales:* Absent on front of snout and margins of preoperculum, on all rest of body higher than long, semielliptical or oblong, with about four undulations in posterior margin, which is finely serrated by the ends of very fine rough thread-like radiating striæ; lateral line indistinctly marked, of 94 scales, running parallel with back at one-fourth of the height from it, with about 8 small ones beyond on tail; 15 scales from front of dorsal to lateral line, and 28 from

lateral line to ventral edge, all finely striated, with thin, entire waved edges; exposed portion about middle of body below the lateral line semielliptical, nearly three times higher than long; anterior covered part forming a vertically elongate, thick, slender ridge acutely pointed above and below, greatest thickness in middle rather less than the length of the exposed part, but the vertical extent of the anterior ridge more than double the vertical measurement of the exposed portion; scales of lateral line much smaller and with the length and height of the exposed portion more nearly equal, and the anterior ridge only extending in short angular points above and below the exposed portion, which is otherwise like the others. The anterior ridges of the scales produce distinct vertical ridges on the body. *Color:* Whole body, head, and vertical fins lead-grey with lustre of lead, darker or blacker with brownish tinge on back and fins; hind portions of pectoral and ventral fins nearly colorless, with a slight yellowish tinge; iris brownish or yellowish above and in front, blackish below and behind.

MEASUREMENTS.

	Ft.	ins.	lines.
Length from tip of lower jaw to end of lobe of caudal ...	1	3	0
Depth of body	0	5	0
Thickness of body	0	1	6
Length of head from chin to edge of gill-cover	0	3	0
„ of posterior edge of orbit to edge of gill-cover ...	0	1	4
Diameter of eye	0	0	9
Length from bottom of orbit to lower edge of suboperculum ...	0	1	7
„ „ upper edge of orbit to back line of top of head ...	0	1	0
„ of pectoral	0	3	3
„ of ventral	0	1	1
„ of highest ray of dorsal	0	2	3
Height of middle of dorsal	0	0	8
Length of dorsal	0	6	4
„ of lobes of caudal	0	3	7
„ of middle of caudal	0	1	0
„ of anal	0	5	0
„ of longest ray of anal	0	1	8
„ of middle rays of anal	0	0	8
„ of exposed portion of largest scales about middle of body below lateral line	0	0	1½
Vertical extent of ditto	0	0	5
„ „ of anterior ridge	0	0	11
Longitudinal greatest measure of ditto	0	0	1
Length of exposed part of scales of lateral line	0	0	1½
Vertical extent of ditto	0	0	2
„ „ of anterior ridge	0	0	3
Four scales in a length of ½ in. at middle of body; about two of the rounded radiated portion of scales in the same vertical distance, but spinous ends of the thick vertical ridges extend farther.			

REFERENCE.—Bloch and Schn., p. 99; Cuv. and Val., Hist. Poiss., v. 7, p. 281, t. 190.

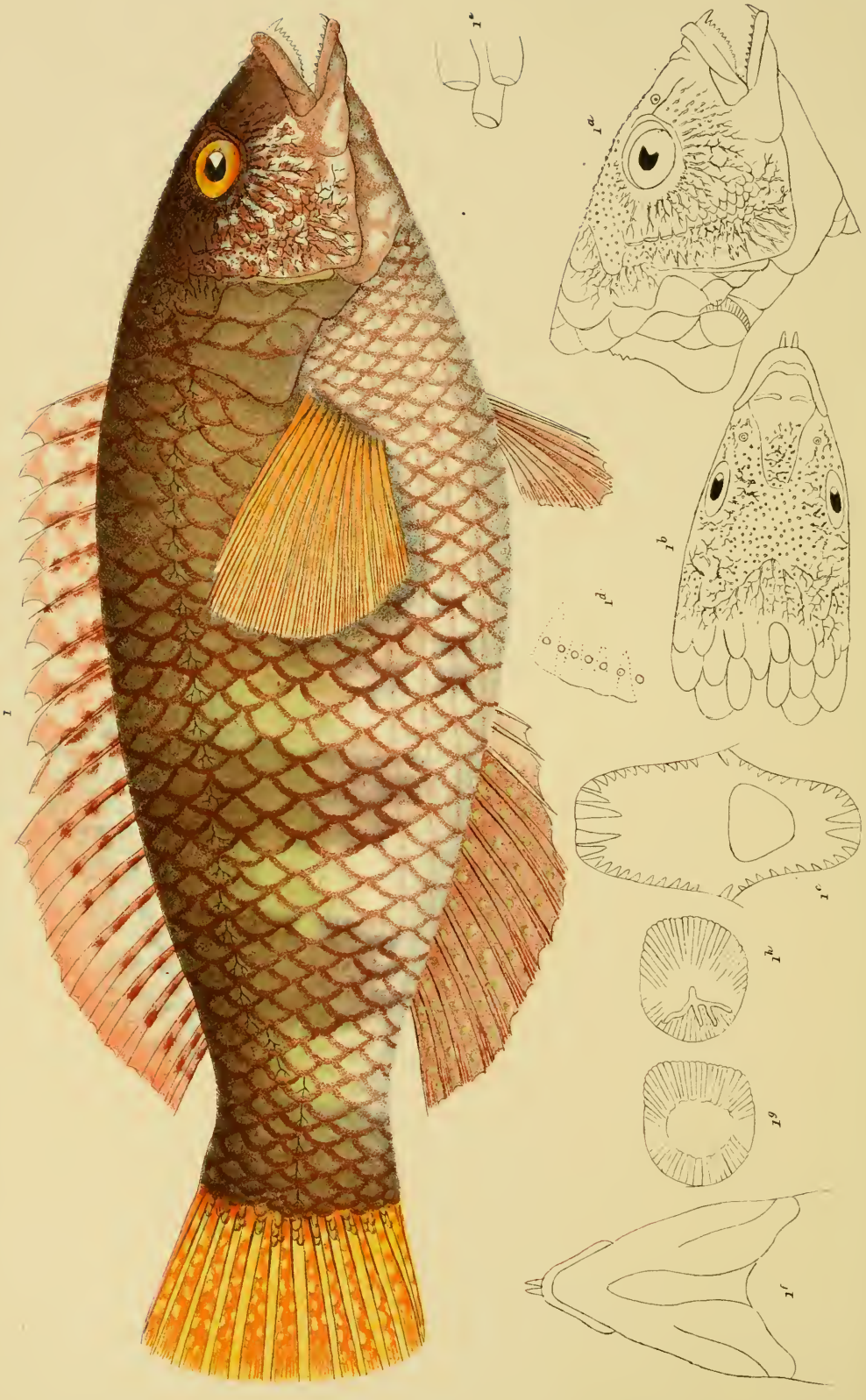
This remarkable fish appeared at Portland in considerable number in April 1884, being previously unknown to the fishermen, and has not been, as yet, seen on any other part of the Victorian coast, although noted by Count Castlenau at Sydney. I see no difference between our specimens and the European ones. This is considered one of the most delicious fishes for the table, of the

Mediterranean, and the readiness with which the gourmets of Victoria recognise this quality in so unusual a visitor to our shores is rather amusing, most pressing letters requiring the name of this god-send arriving by every post for some time afterwards.

Explanation of Figures.

Plate 133.—Fig. 1, side view of specimen, one-half the natural size. Fig. 1*a*, interior of mouth, showing teeth on upper and lower jaws and palate, and single one on vomer, natural size. Fig. 1*b*, anterior portion of dorsal fin, natural size, showing the rows of scales. Fig. 1*c*, natural size of lower portion of dorsal. Fig. 1*d*, form of section of body at base of pectoral. Fig. 1*e*, form of section of tail. Fig. 1*f*, portion of scaling of body, twice the natural size, to show the vertical ridges. Fig. 1*g*, scale from below lateral line, magnified two diameters, to show the very long, spinose vertical ridge. Fig. 1*h*, scales from above lateral line, magnified four diameters, showing the shorter vertical extension of ridges. Fig. 1*i*, scale from lateral line, magnified four diameters.

Frederick McCoy.



A. Bartholomew del et lith.

Prof. McCoy direx.

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PLATE 134.

LABRICHTHYS BLEEKERI (CAST.).

BLEEKER'S PARROT-FISH.

[Genus LABRICHTHYS (BLEEKER). (Sub-kingdom Vertebrata. Class Pisces. Sub-class Teleostea. Order Acanthopterygii. Sub-order Pharyngognathi. Family Labridæ.)

Gen. Char.—Body moderately compressed, oblong; snout narrow, projecting; scales large; operculum scaly; cheeks more or less scaly; preoperculum not serrated. Lateral line continuous. Teeth sharp, conical, in 1 or 2 rows in upper jaw; usually 1 or 2 large canine teeth on each side in front, and often a large, conical, posterior canine tooth at angle of mouth in upper jaw. Fins, 9 spinous and 10 or 11 branched rays in dorsal, and 3 spinous and 10 branched in anal. Pacific and Indian Archipelago.]

D. 9 + 10; V. 1 + 5; A. 3 + 10; P. 13; C. 14; L.L. $26\frac{4}{10}$.

DESCRIPTION.—Body ovate, greatest depth a little in front of middle, moderately compressed; depth about $3\frac{1}{3}$ in total length, including caudal. Head moderate, about $3\frac{2}{3}$ in total length; cheeks with radiating, branched ridges behind and below the eye, and coarsely granulated above and in front of eye, with a vertical curved patch of scales rather nearer the edge of the preoperculum than the eye, large, tubular, and in 1 row above, smaller, simple, and in 2 and 3 rows below; 3 imperfect rows of large, rounded scales on the operculum; gill-opening large, curved; smooth, rounded lobe of operculum nearly quadrate and almost touching upper edge of pectoral fin. *Teeth:* a series of 12 conical teeth above, and 11 below, diminishing from the front canines, which are much the largest; with or without a posterior upper canine at corner of mouth; a row of much smaller and blunter teeth inside the outer row. *Scales:* of body large, not extending on dorsal fin; those of lateral line 26, branching tubules smooth, very irregular, the branches varying from 2, or more frequently 3, to the most frequent number 4, descending abruptly at the 20th (which is under the last ray of dorsal fin), the width of 1 scale, the 5 last scales running to a little above middle of caudal fin, on which are from 3 to 6 smaller, simple scales, forming short rows between the rays; there are 4 rows of scales above and 10 below the lateral line at middle of body. *Fins:* Spinous part of dorsal of 9 spines, shorter than the 10 branched rays, which increase to the 5th, and then decrease to the end, so that the last ray is twice its length from the caudal; caudal sub-truncate, obtusely rounded, of 14 rays; anal terminating slightly in front of dorsal; ventral of 1 spine and 5 branched rays, sub-rhombic or sub-ovate, not prolonged into a slender point; pectoral large, rounded. *Color:* Ground color of back and sides olive-green (darkest on back and on 3 or 4 imperfect, vertical bands, one at base of tail, one at end of dorsal and anal fins, one in front of middle of those fins, and one extending from posterior end of spinous dorsal on to head), and whitish pale blue below; posterior margin of each scale edged with dull carmine-red; top of head dark reddish-olive; cheeks and throat dull red, marbled with irregular spots and vermicular marks of bluish-white; dorsal fin mottled irregularly with pale clouds of green and reddish; rays reddish, with three irregular rows of dull, purple, cloudy spots; the soft dorsal with a broad margin of pale red; caudal with greenish-yellow membrane and orange rays, irregularly variegated with one or two rows of red spots; anal dull red, with four rows of round green spots on the membrane (in one specimen the fin is green, and spots red); ventrals pale red; pectorals with brilliant chrome-yellow rays and pale greenish-yellow membrane; iris with irregular, imperfect circles of green, white, and orange.

Measurements.	Ins.	lines.
Length from tip of snout to end of caudal	8	4
„ „ „ anterior edge of eye	0	8
„ „ „ posterior edge of eye	1	1
„ „ „ end of operculum	2	3
„ „ „ base of pectoral	2	2
„ „ „ base of caudal	7	2
„ „ „ 1st dorsal spine	2	3
„ „ „ last dorsal ray	5	11
„ „ „ base of ventrals	2	7
„ „ „ 1st anal spine	4	3
„ of pectoral	1	6
„ of ventral	1	1

Reference.—Proc. Zool. and Acc. Soc. Vict., v. 1, p. 148.

Like all of the genus, this beautiful Wrasse varies somewhat in color, the anal fin particularly being as often green with red spots, as like our figured specimen—dull red with green spots. The pearly-white mottling of the cheeks is most characteristic, as well as the red edging to the body scales. It is obvious that too much importance has been given to the posterior canine tooth by systematic writers, as one side of the mouth of the figured specimen has no trace of one, while the other has it well developed. In the upper jaw the inner row of small blunt teeth is of about 17, the longer pointed teeth of outer row 12, with one large solitary one at corner of mouth. There are about 11 pointed conical teeth on each side of lower jaw in a single row. The branching of the tubules of the lateral line is most unusually irregular in number of the branches; they are smooth, and without pores on the surface.

This species, like the other Parrot-fishes, may be seen occasionally in the fish-shops in April, May, and June, as beautiful curiosities rather than for sale for the table, the flesh not being generally esteemed. Small crustacea are found in the stomach, and obviously constitute the usual food.

This fish has not been figured before.

Explanation of Figures.

Plate 134.—Fig. 1, average specimen, natural size. Fig. 1*a*, side of head in outline, to show three rows of cheek scales below, the radiating branched ridges, and the granules. Fig. 1*b*, top of head, to show granules. Fig. 1*c*, outer row of teeth, magnified two diameters. Fig. 1*d*, outer row of teeth dotted, showing relative position of smaller, blunt teeth of inner row, magnified four diameters. Fig. 1*e*, some of upper cheek scales, magnified, to show tubular posterior margin. Fig. 1*f*, outline of under-side of head, showing the relation of the subopercula and form of isthmus. Fig. 1*g*, scale of back, magnified one and a half diameters. Fig. 1*h* scale from lateral line with greatest number of branches, magnified one and a half diameters.

Frederick McCoy.

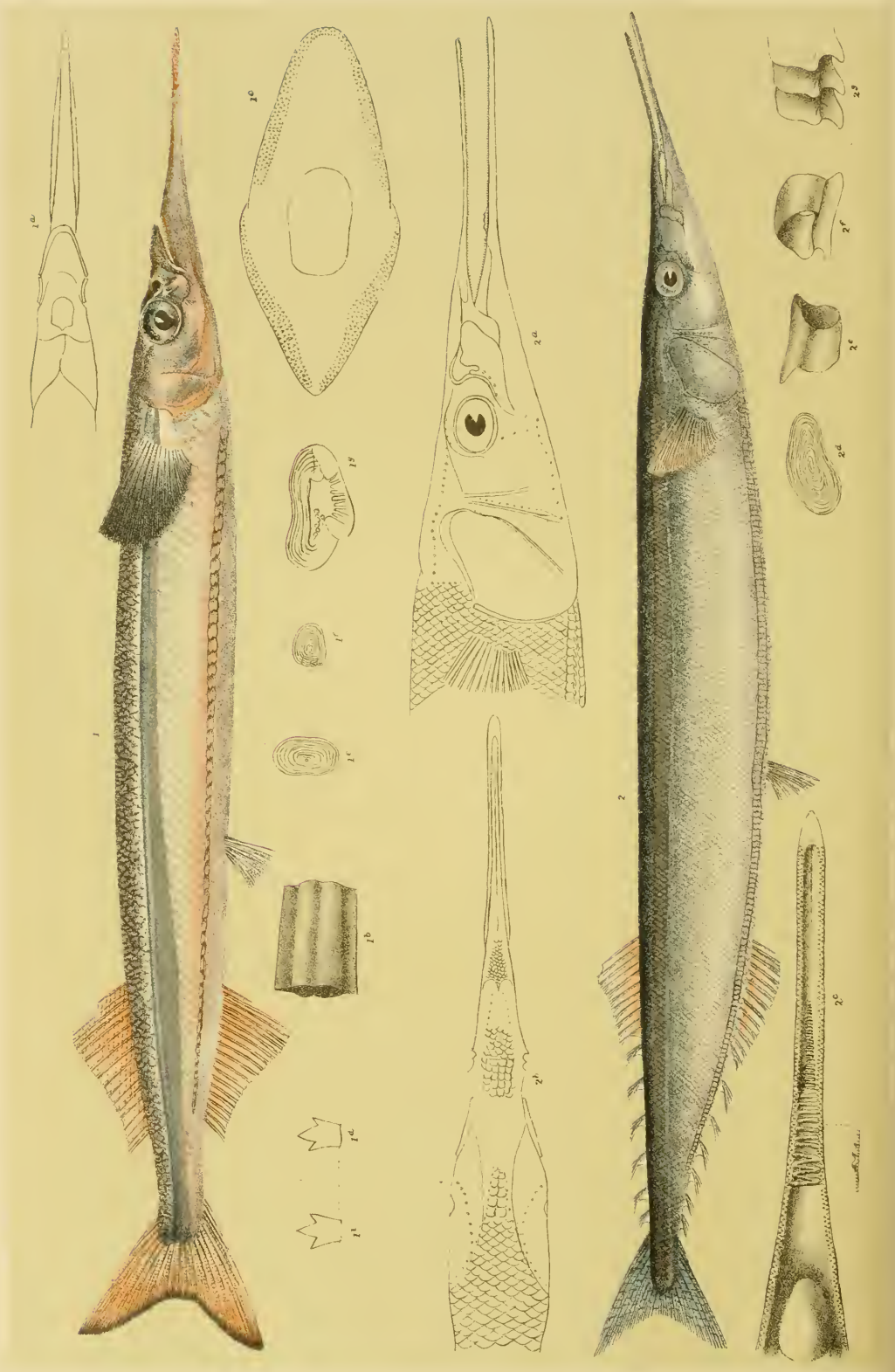

PLATE 135, FIG. 1.

HEMIRAMPHUS INTERMEDIUS (CANT.).

THE BLACK-FINNED HALF-BEAK OR SEA GAR-FISH.

[Genus HEMIRAMPHUS (Cuv.). (Sub-kingdom Vertebrata. Class Pisces. Sub-class Teleostei. Order Physostomi. Family Scomberesocidæ.)

Gen. Char.—Body elongate, slender, compressed. Head elongate; upper jaw short, triangular, convex above, formed of the inter-maxillaries in the middle and the maxillaries at the sides; lower jaw prolonged beyond the upper in a long slender beak, with a flexible termination representing the lips (lower jaw short in very young individuals); lower pharyngeals united into a single bone; gill-opening very wide. Teeth very minute, in a band of several rows on upper jaw and corresponding portion of base of lower jaw. Scales moderately large, rounded, with a row of much smaller, strongly carinated ones, forming a keel along each side near the ventral margin. Dorsal fin single, opposite the anal fin, and equal to it; no finlets; caudal usually moderately forked, with the lower lobe largest; pectorals moderate, semioval; ventrals small, near middle of ventral margin. Stomach and intestine straight. No pyloric appendages. Air-bladder large, without pneumatic duct.]

D. 16 to 17; P. 12 to 13; V. 6; A. 18 to 19; C. $\frac{2}{2}\frac{2}{3}$. Scales 52 to 56, from head to tail.

DESCRIPTION.—Length of head from tip of beak to edge of operculum slightly less than one-third of the total length to base of caudal. Length of lower jaw beyond tip of upper one slightly more than half the length of head, $5\frac{4}{5}$ in total length to base of caudal. Length and width of movable portion of upper jaw nearly equal. Top of head slightly convex; diameter of orbit less than inter-orbital space, and $1\frac{2}{3}$ in the length of post-orbital part of head. Pre-orbital plate about as long as high. Middle of back flattened, very slightly convex. Base of ventrals half way between base of caudal and base of pectoral. Teeth in both jaws minute, tricuspid. *Color:* Back pale olive-green, darkest on top of head and towards tail from front of dorsal to caudal fin; terminal portion of lower jaw flesh-red; a broad, distinct, silvery stripe from top of base of pectoral to middle of base of caudal, having a blue, or emerald-green, or, in some lights, yellowish stripe above it. Sides below the silver band pearly, very pale green, with opaline reflections of blue and pink fading to nearly white on midline of belly and throat. Cheeks and opercular pieces brilliant silvery, with opaline blue, green, and pink reflections. Iris silvery, with green and bronze reflections. Pectoral fins dusky or blackish, darkest towards the tip, from crowded, minute, black dots. Ventral nearly colorless, the rays minutely dotted with black. Dorsal and anal fins very pale olive. Caudal brownish-olive, with blackish margin. *Measurements:* Length of average specimen, from tip of lower jaw to tip of caudal, 1 ft. 4 ins. Proportional measurements: tip of snout to tip of upper jaw, $\frac{15\frac{1}{2}}{100}$; to gape, $\frac{18}{100}$; to anterior edge of orbit, $\frac{20\frac{1}{2}}{100}$; to posterior edge of orbit, $\frac{24}{100}$; to posterior edge of operculum, $\frac{30}{100}$; to base of pectoral, $\frac{32}{100}$; to tip of pectoral, $\frac{40}{100}$; to base of ventral, $\frac{62}{100}$; to tip of ventral, $\frac{66}{100}$; to front edge of dorsal, $\frac{74}{100}$; to hind edge of dorsal, $\frac{85}{100}$; to front edge of anal, $\frac{75}{100}$; to hind edge of anal, $\frac{85}{100}$; to base of caudal, $\frac{90}{100}$; to middle edge of caudal, $\frac{98}{100}$; greatest depth at middle, $\frac{10}{100}$; greatest thickness, $\frac{8}{100}$; height of dorsal, $\frac{1}{100}$; depth of anal, $\frac{7}{100}$; space between orbits, $\frac{4}{100}$; diameter of orbit, $\frac{3\frac{1}{2}}{100}$; width of base of upper jaw, $\frac{4}{100}$; length of base of upper jaw, $\frac{4}{100}$.

REFERENCE.—Cant. An. & Mag. Nat. Hist., 1842, v. 9, p. 485=*H. melanochir*, Cuv. & Val., Hist. Nat. des Poiss., v. 19, p. 41.

This species has the ova exuding in the middle of October, which must be the spawning time. The ova are larger than those of the *H. regularis* of the Lakes. It is the common Sea Gar-fish of the fishermen and fish-dealers supplying Melbourne, and is easily distinguished from the fresh-water species of the Gippsland Lakes, *H. regularis* (Günt.), by the blackish pectoral fins, suggesting the excellent specific name, *H. melanochir*, given to it by Cuvier, as well as by the more posterior position of the ventral fins and the long movable upper jaw.

Explanation of Figures.

Plate 135.—Fig. 1, side view of specimen, $\frac{2}{3}$ natural size. Fig. 1*a*, top view of head and snout, $\frac{2}{3}$ natural size, to show the flexible membranous borders and tip of lower jaw beyond upper jaw. Fig. 1*b*, top view of portion of lower jaw, magnified four diameters. Fig. 1*c*, mouth, to show rows of teeth in upper and lower jaws, magnified. Fig. 1*d*, tricuspid teeth of upper and lower jaws, magnified sixteen diameters. Fig. 1*e*, scale below lateral line at middle of body, magnified three diameters. Fig. 1*f*, scale above lateral line, magnified three diameters. Fig. 1*g*, scale from abdominal ridge, magnified three diameters.

Plate 135, Fig. 2.

SCOMBERESOX SAURUS (Bloch sp.), var. FORSTERI (Cuv. and Val.).

The Saury Pike.

[Genus SCOMBERESOX (Lacép.). (Sub-kingdom Vertebrata Class Pisces. Sub-class Teleostei. Order Physostomi. Family Scomberesocidæ.)

Gen. Char.—Body elongate, slender, compressed. Head prolonged into two long, very slender jaws, with a slight upward curvature, the upper formed of the inter-maxillary bones, the lower beak a little longer than the upper; both jaws bordered with a row of very minute, simple teeth, none on the tongue nor palate. Scales small, thin, deciduous on body; a row of keeled scales on each side of lower edge of belly; lateral line very obscure, from upper end of operculum to middle of tail. One dorsal opposite one similar anal fin, set far back, with a series of small detached finlets between the dorsal and anal fins and the tail; caudal fin deeply forked. Air-bladder present or absent, without duct. Stomach and intestines forming one straight alimentary canal, without pyloric appendages. Lower pharyngeals united in one bone. Nostrils in a triangular pit in front of eye. Pseudobranchiæ glandular, obscure. Gill-opening very wide.]

D. 10 to 11; P. 12; V. 6; A. 11 to 12; Finlets $\frac{6}{7}$; C. 20 to 30; L.L. about 110.

Description.—Length of head two-sevenths of total length, including caudal fin. Greatest depth of body (about middle), 11 times in total length from tip of

lower beak to end of upper lobe of caudal; depth at base of pectoral equal to depth in front of dorsal and anal fins; depth of tail between last finlet and caudal, $4\frac{1}{2}$ times in greatest depth at middle of body; beak nearly straight, very slender; beak of lower jaw from angle of commissure less than the rest of the head to edge of operculum, broader than deep, tip soft and flexible, $7\frac{1}{3}$ times in total length to tip of caudal; upper beak more slender than, and fitting in a groove in, the lower one, of which it is $\frac{6}{7}$ the length; sub-orbital plate sub-quadrate, with a shallow sinus in the oblique front edge; a small, deep, narrow notch below the nostril, and produced backwards in a narrow posterior angle as far as first third of diameter of eye. Base of ventral half way between base of caudal and anterior margin of orbit; diameter of eye about $2\frac{2}{3}$ in post-orbital portion of head. Diameter of eye about 5 times in length of cheek from end of gape to edge of operculum, a slight mucous swelling in front, with a row of mucous pores; another row of pores along lower edge of preoperculum, and another row from top of orbit to the shoulder. Lower jaws, and also the edges of the opercular plates, nearly touching under the throat, from the narrowness of the isthmus; branchiostegal membrane hid under the opercular plates. Six finlets above and seven below, the anterior one slightly smaller than the second, and connected by membrane with the dorsal and anal fins; the row of keeled scales along belly ends at fourth lower finlet. *Color:* Dark blue on back, with slight greenish reflections; sides, belly, opercular plates, and cheeks below the eye brilliant silvery-white; caudal fin and upper finlets blue; other fins paler. Iris silvery. *Measurements:* Total length from tip of beak to lower lobe of caudal, 12 to 15 inches. Proportional measurements to 12 ins. as 100: Tip of lower beak to tip of upper one, $\frac{2}{100}$; to gape, $\frac{13}{100}$; to front edge of orbit, $\frac{17}{100}$; to hind edge of orbit, $\frac{20}{100}$; to upper base of pectoral, or end of operculum, $\frac{27}{100}$; to base of ventrals, $\frac{56}{100}$; to base of anal, $\frac{70}{100}$; greatest depth of body, $\frac{9}{100}$; greatest thickness of body, $\frac{5}{100}$; length of pectorals, $\frac{6}{100}$; length of ventrals, $\frac{5}{100}$; length of upper lobe of caudal, $\frac{7}{100}$; length of lower lobe of caudal, $\frac{9}{100}$; length of middle rays of caudal, $\frac{2}{100}$. Seven scales in a length of $\frac{1}{2}$ in. at middle of body; 12 keeled scales in same length at middle of abdominal row.

Reference.—*Esox saurus*, Bloch & Schn., p. 394, t. 78 = *Scomberesox Camperi*, Lacép., v. p. 345; Cuv. & Val. Hist. Nat. des Poissons, v. xviii., p. 464, t. 551 ? = *Scomberesox Forsteri*, Cuv. & Val., v. xviii., p. 481.

The upper beak is longer in proportion to the lower than in the *S. Camperi*, in which it is represented by Cuvier and Valenciennes to be only three-fourths of the length of the lower; but I, unfortunately, have no European specimen to make sure of this character or of the size of the scales, which, Dr. Günther thinks, may distinguish the northern species, but he does not give the size for the *S. saurus* or *Camperi* of Northern waters, as I do here for the Australian fish. The sub-orbital plate in front of and below the nostril is smaller, more upright, and with a more distinct sinus in the front margin than in the *S. Camperi*, as figured and described by Cuvier and Valenciennes, the front margin being less oblique, but, like it, has a deep, narrow, vertical slit below the nostril.

Although the species of *Scomberesox*, like the Mackerel, have finlets between the dorsal and anal fins and the tail, they have no adipose eye-lid. Like the Mackerel also, species of this genus, almost undistinguishable externally, really differ by the presence or absence of the swim-bladder; the English and Mediterranean Mackerel differing in this respect, as the present *Scomberesox* and the Atlantic specimens differ from the Mediterranean one, by having a swim-bladder, which does not exist in the latter. The swim-bladder is very distinct in our species.

I greatly doubt the distinctness of this species or variety from *S. saurus*, but am not sure of the amount of variation in the relative lengths of the jaws in the latter; Cuvier figuring and describing the upper jaw as considerably shorter, but praising the accuracy of Donovan's figure of an English example, which has the jaws as nearly equal as ours. I find about the same number of scales as Dr. Günther attributes to *S. saurus* in the longitudinal lines from head to tail, so that his suggestion that *S. Forsteri* may have smaller scales does not, I think, stand as a distinction between the species.

Three specimens in the Museum were caught in Hobson's Bay in April.

Explanation of Figures.

Plate 135.—Fig. 2, side view of specimen, three-fourths the natural size. Fig. 2*a*, side view of head, seven-eighths natural size, to show form of plates and rows of mucous pores. Fig. 2*b*, head, viewed from above, showing the lower jaw extending beyond the upper at sides and tip. Fig. 2*c*, interior of lower jaw, showing rows of teeth on side, and transverse horny ridges on middle. Fig. 2*d*, scale of body, magnified. Figs. 2*e*, 2*f*, 2*g*, scales of abdominal keels, magnified.

Frederick McCoy.

* 136

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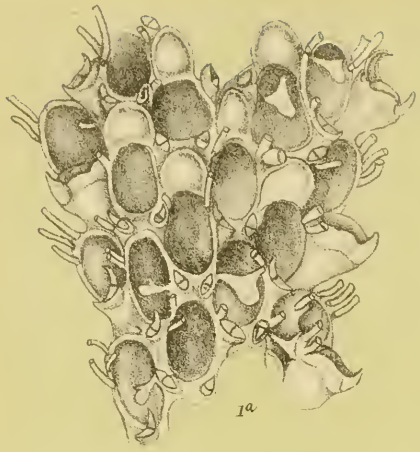

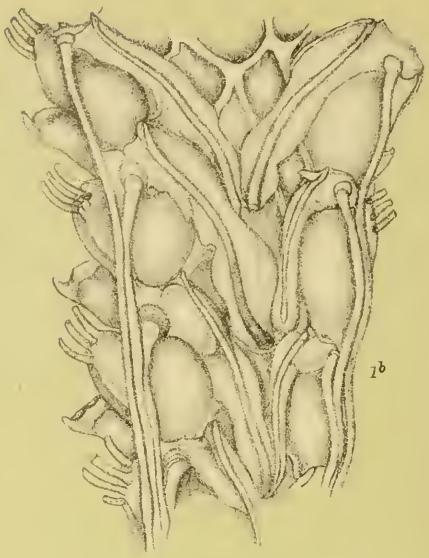

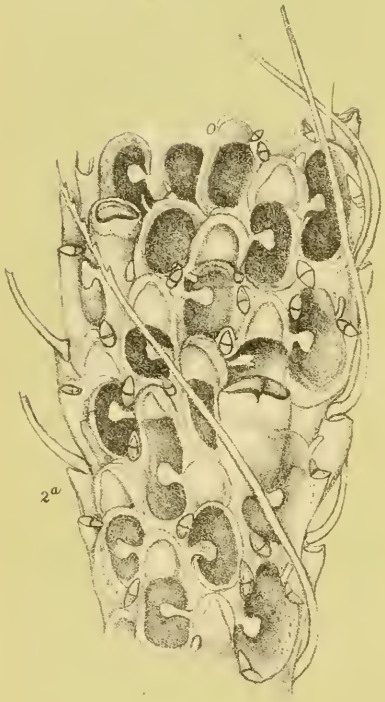

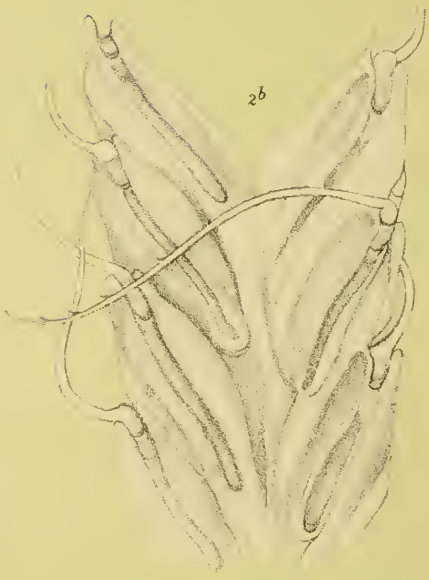

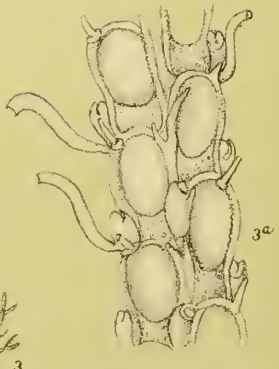

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J. Kipperbith

Prof. McCoy direct

Steam litho. Govt. Printing Office

PLATE 136, FIG. 1.

CABEREA RUDIS (BUSK).

[Genus CABEREA (LAMX). (Sub-kingdom Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Family Cellulariidæ.)

Gen. Char.—Zoarium continuous, or imperfectly jointed, dichotomously branched. Zoœcia bi-multiserial, quadrate; an avicularium on the outer side of the lateral, and one or two at the base of the internal zoœcia. Vibracula large, situated at the back of the branches, biserial, each common to several zoœcia.]

DESCRIPTION.—Zoarium with the branches broad, about one-eighth of an inch, strap-shaped. Zoœcia multiserial; membranous aperture large, elliptical; three large spines articulated at the upper and outer and one at the inner angle of the lateral zoœcia; one or two on each angle of the inner zoœcia; a stout anvil-shaped scutum with a thick peduncle overarching the aperture. Oœcia flat, mitriform, with a thickened margin. In the central zoœcia two slightly raised avicularia, with triangular mandibles pointing upwards, on the lamina below the aperture; on the lateral zoœcia a single large avicularium, narrowed below and expanded above, with a thickened margin and stout beak to the rostrum, and a long, triangular, pointed mandible directed horizontally outwards. Posterior surface flat, outline of zoœcia diamond-shaped, longitudinally sulcate. Vibracular setæ short, slender, slightly serrated, the vibracular cells narrow, and not obscuring the posterior outlines of the zoœcia. Radical fibres springing from the bases of the zoœcia, uniting to form a lateral bundle.

REFERENCE.—Busk, Brit. Mus. Cat. Mar. Pol., pt. i., p. 37, pl. xlvi.

Port Phillip Heads; Portland, Mr. Maplestone.

Forms tufts, of a dirty white color, attaining a height of two inches or more. It is readily distinguished by the large lateral avicularia, which are frequently of enormous size, and by the small size of the vibracular cells, not obscuring the posterior outlines of the zoœcia, with the short slender setæ.

EXPLANATION OF FIGURES.

PLATE 136.—Fig. 1, specimen, natural size. Fig. 1*a*, portion of anterior surface, magnified showing, on one side, the lateral avicularia of enormous size. Fig. 1*b*, posterior view of same, showing the outlines of zoœcia, vibracular cells, and radical fibres.

PLATE 136, FIG. 2.

CABEREA GRANDIS (HINCKS).

DESCRIPTION.—Zoarium with the branches rather broad, strap-shaped. Zoœcia multiserial; membranous aperture large, elliptical or oblong; two spines on the outer and one on the inner angle of the marginal zoœcia, and one on each angle of the

central; a spatulate or clavate scutum with thick peduncle, usually of small size. Oœcia flat, mitriform, with a thickened rim. One or two avicularia at the base of each central zoœcium, with the mandible usually directed upwards; on the lateral zoœcia a very small avicularium, with the mandible placed transversely, on a long, narrow process united throughout to the cell; on various parts of the zoarium occasionally intercalated avicularia of enormous size. Posterior surface of the zoœcia entirely obscured by the vibracular cells, which are distinct, almond-shaped, those of opposite sides meeting in a groove in the centre of the branch; setæ long and serrated. No radical tubes.

Reference.—Hincks, Ann. and Mag. Nat. Hist., July 1881.

Port Phillip Heads.

This species, which attains a height of an inch or more, is readily distinguished from the other multiserial species by the small lateral avicularia, the projection of the vibracular cells beyond the margins of the branches, so as to be visible from the front, and their completely obscuring the posterior surface of the zoœcia. The size and disposition of the vibracular cells, with the long serrated setæ, and the deep groove between the rows, make a striking resemblance to a miniature head of barley. The large avicularia are not frequent, being absent in many specimens. The oral spines, also, are by no means constantly seen, either from being absent or worn off.

Explanation of Figures.

Plate 136.—Fig. 2, specimen, natural size. Fig. 2*a*, anterior surface of portion of same, magnified; two large avicularia are shown, one of great size. Fig. 2*b*, posterior view of the same.

Plate 136, Fig. 3.

CANDA ARACHNOIDES (Lamx.).

[Genus CANDA (Lamx.). (Sub-kingdom Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Family Cellulariidæ.)

Gen. Char.—Zoarium dichotomously branched, branches biserial, connected by transverse chitinous tubes attached at either end to a vibraculum. Avicularia large, situated on a special tract on the front of the branches between the rows of zoœcia. Each zoœcium with a vibraculum posteriorly.]

Description.—Branches rather broad; zoœcia quadrate, a spine at each upper angle, of which that on the outer is the larger; margin thickened, crenulated; aperture elliptical, the lamina smooth or finely granular. Avicularia with the mandibles broadly triangular. Posteriorly the zoœcia elongated, wider in upper half, separated by thick, raised lines. The vibracular groove not extending beyond the median line; setæ short, smooth. Connecting tubes stout.

Reference.—Busk, Brit. Mus. Cat. Mar. Polyzoa, pt. i., p. 26, pl. xxxiii.; Busk, *Challenger* Polyzoa, p. 25.

Port Phillip Heads; Portland, Mr. Maplestone.

Luxuriant specimens attain a height of about 3 inches. Each large branch divides dichotomously, the resulting ramification forming a flabelliform expansion. The various branches of each group are joined by transverse flexible tubes, which are attached at either end to vibracula. At the lower end of the branches, however, many, instead of connecting with other branches, attach the zoarium to the object on which it grows in the same manner as ordinary radical tubes. The avicularia are usually crowded, and of large size towards the growing extremities of the branches, being less frequent or wanting on the older. The mandible is broadly triangular, nearly equilateral. The vibracular groove does not extend beyond the cell with which the vibraculum is connected, and therefore does not cross the mesian line. I have not seen the oœcium; but Mr. Busk (*Challenger* Polyzoa, p. 25) describes it as "subglobose, crowned with a sessile avicularium, and having a broad elliptical membranous area in front."

Explanation of Figures.

Plate 136.—Fig. 3, specimen, natural size. Fig. 3*a*, front view of portion of same, magnified. Fig. 3*b*, posterior view of same.

Plate 136, Fig. 4.

CANDA TENUIS (McG.).

Description.—Branches very slender, straggling. Zoœcia elongated, a spine on each side above; margins thick and crenulated, lamina granular; aperture elliptical, occupying about two-thirds of the front. Avicularia with the mandible narrow and triangular. Vibracular groove extending beyond the median line. Connecting tubes long and slender.

Reference.—P. H. MacGillivray, Tr. Roy. Soc. Vict., Nov. 1884.

Port Phillip Heads.

Readily distinguished from *C. arachnoides* by its much smaller size, more slender and straggling branches, which do not grow so much in one plane, narrower and more pointed avicularian

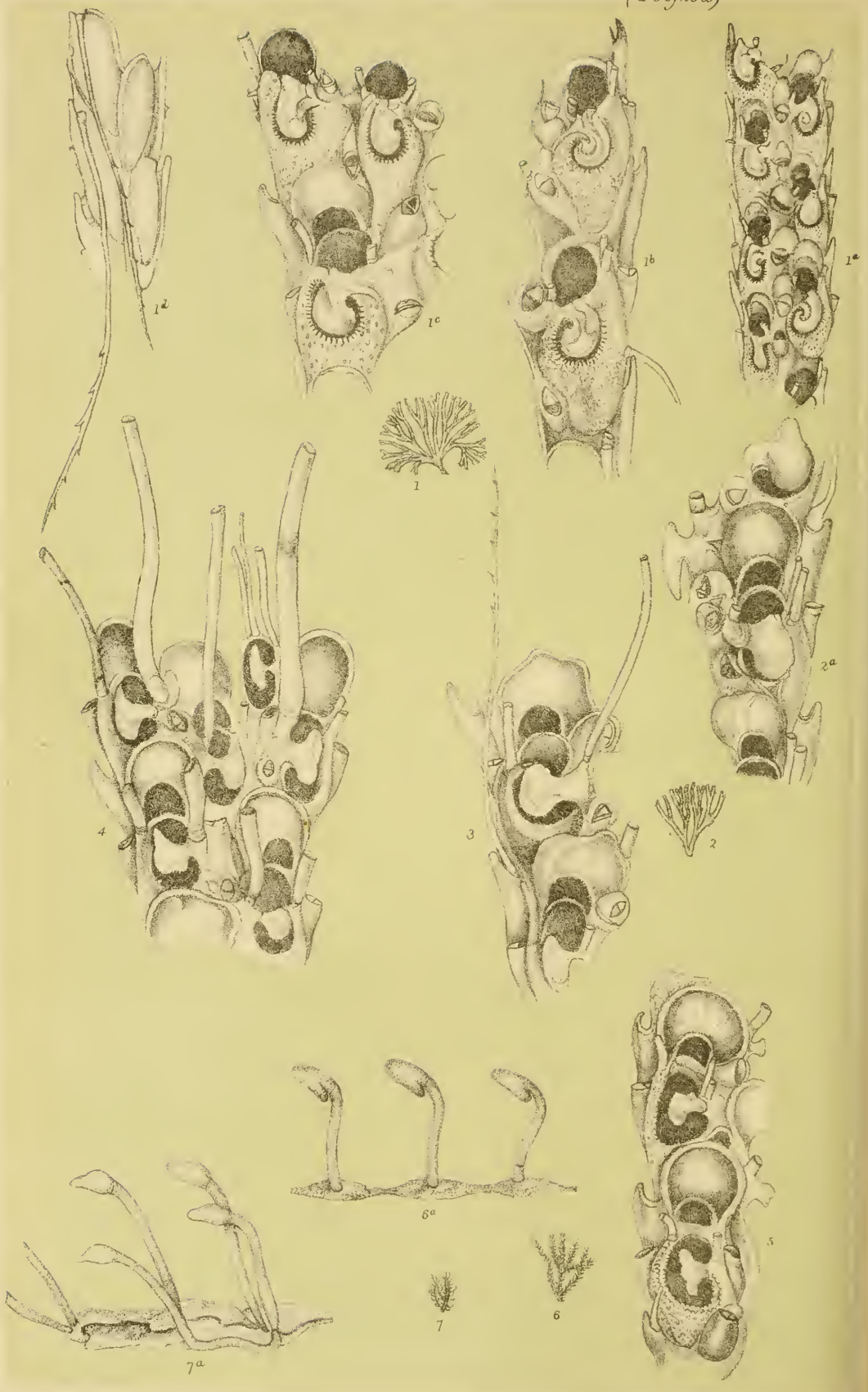
mandible, and especially by the vibracular grooves for the lodgment of the setæ extending across the median line on the surface of a cell of the other series.

EXPLANATION OF FIGURES.

PLATE 136.—Fig. 4, specimen, natural size. Fig. 4*a*, front view of portion of same, magnified. Fig 4*b*, back view of same.

The specimens and descriptions of *Caberea* and *Canda* on this plate have been given by Mr. MacGillivray for the National Museum collection and this work.

FREDERICK MCCOY.



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J. Rippe lith.

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Figs 1, 1a-d, 5 ... to Caberea helicina Hastings, 1943:368

PLATE 137, FIGS. 1 AND 5.

CABEREA DARWINII (BUSK).

[Genus CABEREA (LAMX.). (Sub-kingdom Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Family Cellulariidæ.)

Gen. Char.—Zoarium continuous, or imperfectly jointed, dichotomously branched. Zoœcia bi-multiserial, quadrate. An avicularium on the outer side of the lateral, and one or two at the base of the internal zoœcia. Vibracula large, situated at the back of the branches, biserial, each common to several zoœcia.]

DESCRIPTION. — Zoarium flabelliform. Zoœcia biserial, elongated, narrowed downwards; area large, filled in by a granulated expansion with a thickened crenulated margin; aperture elliptical, almost entirely (except the part occupied by the mouth) covered by the scutum, which has a peculiar helicine mark; two articulated spines at the upper and outer angle, and usually one, as well as a peduncular one, from the inner angle. A small avicularium on the outside of each lateral zoœcium on a narrow prominence; a sessile avicularium at the base of each peduncular spine, with the bluntly triangular mandible pointed downwards; occasionally a small avicularium, with triangular mandible directed upwards, situated between two zoœcia. Oœcia smooth in young specimens, with a marginal rim in older. Posteriorly the vibracula are much elongated, spindle-shaped, with long serrated setæ. Radical tubes numerous, springing from the lower part of the zoœcia, and converging to form a ridge down the back of the branches.

REFERENCE.—Busk, *Challenger* Polyzoa, p. 29.

Port Phillip Heads; Portland, Mr. Maplestone.

In the *Challenger* Polyzoa, Mr. Busk describes and figures a form from New Zealand under the name of *C. Darwinii*, which he says is identical with that described in the British Museum Catalogue as *C. Boryi* and figured as *C. Patagonica*. It is not uncommon here, and I quite agree with Busk in considering it as distinct from the European species, with which it and the next have been generally confounded. It is characterised by the zoœcia being narrowed downwards, the lower part and sides of the area filled in by a granular layer, with the margin of the aperture finely crenulate. In perfect specimens, the scutum is of large size, nearly filling all the aperture, except that part corresponding to the mouth. It is nearly straight above, with frequently a small process or spur projecting upwards, and the large downwardly expanded lamina has a peculiar helicine mark. Busk describes and figures the scutum as plain; but there can be no doubt of the

identity of the species. In older specimens the edge of the lamina is usually worn off, and the appearance is then much altered, as in fig. 5. The oœcium when young has the edge smooth, but it gradually becomes surrounded by a thickened margin.

Explanation of Figures.

Plate 137.—Fig. 1, specimen, natural size. Fig. 1*a*, portion of same, magnified. Fig. 1*b*, two zoœcia of same, more highly magnified, showing the lateral and central avicularia and scutum. Fig. 1*c*, another portion of the same, showing an oœcium before the development of the marginal rim. Fig. 1*d*, portion of posterior surface, showing vibracula. Fig. 5, another older specimen, natural size. Fig. 5*a*, portion, magnified, showing the scutum worn and the oœcia with thick marginal rim.

Plate 137, Figs. 2, 3, and 4.

CABEREA GLABRA (McG.).

Description.—Zoarium expanded, flabelliform. Zoœcia biserial, slightly narrowed below, area partly filled in by a smooth plate; scutum with a thick peduncle, the mandible usually chiefly expanded downwards, reniform or hammer-shaped; two spines at the outer angle above, and one, frequently of enormous size, from the peduncle of the scutum. Lateral avicularia small; central avicularia large, irregularly placed above or below the peduncle. Zoœcia posteriorly elongated, smooth or faintly sulcate, vibracular setæ serrated. Oœcia rounded, arcuate or irregular, flattened in front with a thickened margin.

Reference.—P. H. MacGillivray, Tr. Roy. Soc. Vict., 1885.

Port Phillip Heads.

This species differs from *C. Darwinii* in the smoothness of the lamina partly filling the area. It is closely allied to the European *C. Boryi*, in which the zoœcia are shorter and broader and have a thickened smooth band round the aperture. The peduncular spine is sometimes much hypertrophied, and I was at one time inclined to describe the form fig. 4 as a distinct species (*C. dolabrata*) characterised by the enormous size of these spines, and the form of the scutum extended to a sharp point above the peduncle and to a blunter end below.

Explanation of Figures.

Plate 137.—Fig. 2, specimen, natural size; the branches are made too thick. Fig. 2*a*, portion of the same, magnified; the oœcia here have not yet developed a thickened rim. Fig. 3, portion of another specimen, magnified, showing a large peduncular spine and irregularly shaped oœcia. Fig. 4, portion of specimen of var. *dolabrata*, magnified, showing enormous peduncular spines and scutum forming a sharp process above.

Plate 137, Fig. 6.

ÆTEA DILATATA (Busk).

[Genus ÆTEA (Lamx.). (Sub-kingdom Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Family Æteidæ.)
Gen. Char.—Zoœcia arising from a creeping or partially free stolon, calcareous, tubular, with a subterminal membranous area. No avicularia or oœcia.]

Description.—Extremity cyathiform, with a subcircular membranous area; tube finely ringed, dilated portion minutely punctate.

Reference.—Busk, Brit. Mus. Cat. Mar. Polyzoa, pt. i., p. 30, pl. xv., figs. 2, 3.

Port Phillip Heads.

Explanation of Figures.

Plate 137.—Fig. 6, small alga overrun by this species, natural size. Fig. 6*a*, three zoœcia and stolon, magnified. The tubular portions of the stolon between the enlargements are usually much longer than in the figure.

Plate 137, Fig. 7.

ÆTEA ANGUINA (Linn. sp.).

Description.—Extremity spatulate, with an elongated membranous area; tube finely ringed, spatulate portion minutely punctate.

Reference.—Busk, Brit. Mus. Cat. Mar. Polyzoa, pt. i., p. 31, pl. xv., fig. 1.

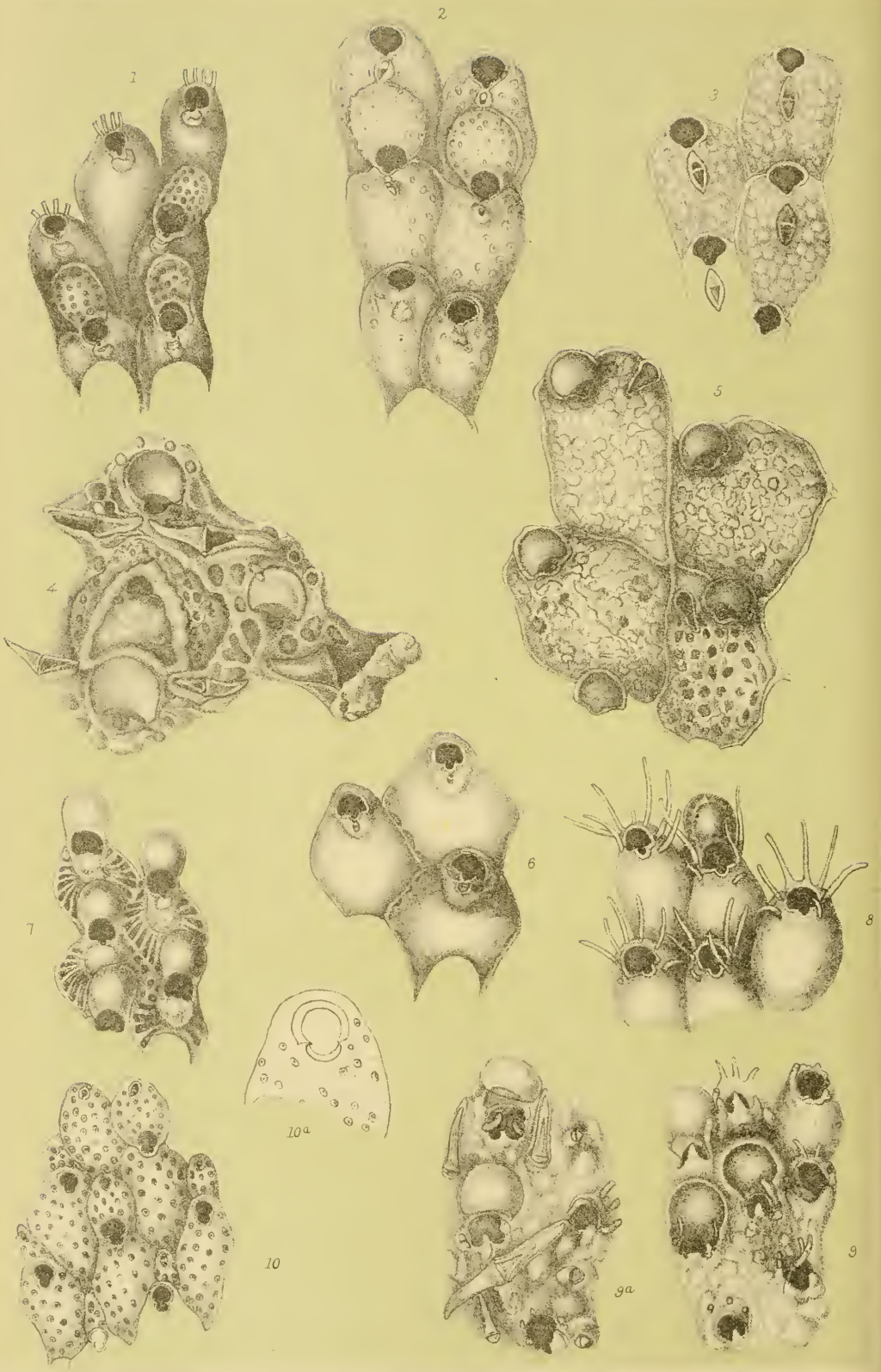
Port Phillip Heads.

Explanation of Figures.

Plate 137.—Fig. 7, specimen, natural size, covering a small alga. Fig. 7*a*, portion, magnified.

The specimens and descriptions of the Polyzoa on this plate are from Mr. MacGillivray.

Frederick McCoy.



P. J. Macculloch del. J. Pepper lith.

Prof. M'Coy auct.

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PLATE 138, FIG. 1.

SCHIZOPORELLA PUNCTIGERA (McG.).

[Genus SCHIZOPORELLA (HINCKS). (Sub-kingdom Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Family Escharidæ.)
Gen. Char.—Zoarium encrusting, adnate, or erect, and uni- or bi-laminate. Zoœcia closely adherent to each other. Lower lip with a median notch.]

DESCRIPTION.—Zoœcia ovate or quadrate, arranged in linear, radiating series, smooth or more frequently minutely granular; mouth rounded above, nearly straight below, with a narrow, sharply defined sinus; 4–7 spines on the upper margin; a minute avicularium on an elevation below the mouth. Oœcia rounded, thickly punctate, and with a smooth rim.

REFERENCE.—P. H. MacGillivray, Tr. Roy. Soc. Vict., July 1882.

Port Phillip Heads.

EXPLANATION OF FIGURE.

PLATE 138.—Fig. 1, small group of zoœcia, showing also oœcia, magnified. In this specimen the surface of the zoœcia was almost quite smooth; it is usually finely granular, as in the next species.

PLATE 138, FIG. 2.

SCHIZOPORELLA LATA (McG.).

DESCRIPTION,—Zoœcia quadrate or oval, arranged in linear series; front slightly convex, granulo-punctured; mouth large, with a rather wide, shallow-pointed sinus in the lower lip; below the mouth a small elevation bearing a minute avicularium. Oœcia large, rounded, thickly punctate.

REFERENCE.—P. H. MacGillivray, Tr. Roy. Soc. Vict., July 1882.

Port Phillip Heads.

These two species are very closely allied, but are readily distinguished by the sinus in the lower lip, which in *S. lata* is wide and rather shallow, while in *S. punctigera* it is narrow and sharply cut. Busk's *Challenger S. marsupiata* seems to be *S. lata*.

EXPLANATION OF FIGURE.

PLATE 138.—Fig. 2, small portion of specimen, magnified.

PLATE 138, FIG. 3.

SCHIZOPORELLA TRIANGULA (HINCKS).

DESCRIPTION.—Zoœcia large, quadrate, flat, separated by slightly raised margins; surface roughly granular and frequently with minute perforations; mouth wide, slightly arched above, with a wide sinus in the lower lip, at each angle of which is a small articular process. A large sessile avicularium immediately below the mouth, with the long, narrow mandible pointed directly downwards.

REFERENCE.—Hincks, Ann. and Mag. Nat. Hist., July 1881; Busk, *Challenger* Polyzoa, p. 167.

Port Phillip Heads.

This is a very marked species. The zoœcia are large, usually quadrate and arranged in radiating linear series, but sometimes oval and very irregular. The broad, shallow, sub-triangular mouth, and the large sub-oral avicularium with its long mandible directed straight downwards, are sufficiently distinctive. I have not seen the oœcia, which, according to Hincks and Busk, seem very peculiar. The description given by Mr. Hincks is—"Oœcium very large, covering almost the whole of the cell above it, rounded, often traversed by raised white lines, with one or more projecting pointed processes on each side in front, overhanging the opening, and opposite to them on the lower margin two (sometimes more) strong conical teeth; surface covered with large nodules and punctured; orifice of the ovicelligerous cells very large, elongated transversely, with a slightly sinuated lower margin."

EXPLANATION OF FIGURE.

PLATE 138.—Fig. 3, small portion of specimen, magnified.

PLATE 138, FIG. 4.

SCHIZOPORELLA DÆDALA (McG.).

DESCRIPTION.—Zoœcia large, quincuncial, indistinct; surface deeply areolated; mouth semicircular, or rather higher than wide, nearly straight below, and with a deep, rounded sinus; four or five spines above. A very large avicularium on one or both sides, situated below and outside the mouth, with the mandible extending

obliquely upwards and outwards to nearly opposite the centre of the upper margin of the mouth of the zoœcium in the adjacent series. Oœcium mitriform, deeply imbedded in the zoœcium above, divided into two parts by a thick ridge parallel to the outer edge; the inner part nearly smooth, but areolated at the edges, the outer sloping and also areolated.

Reference.—P. H. MacGillivray, Tr. Roy. Soc. Vict., July 1882; *S. controversa* (Waters), Hincks, Ann. and Mag. Nat. Hist. 1882 - [illegible] fig 2.-

All my specimens are in the Hemeschara form. Hincks describes it from a Victorian specimen, and refers it to Waters' fossil species, *S. controversa*, an identification with which I do not agree. My original name, *S. insignis*, having been shortly before given to an African form, I have substituted the specific name *dædala*. The mandible of the avicularium is sometimes narrower and more pointed, and also situated lower down, than in the specimen figured.

Explanation of Figure.

Plate 138.—Fig. 4, small portion, magnified, showing also an oœcium.

Plate 138, Fig. 5.

SCHIZOPORELLA SUBSINUATA (Hincks).

Description.—Zoarium loosely adnate or free. Zoœcia separated by narrow, raised lines, varying in shape, broad, convex; surface nodular and perforated; mouth with the margin thickened, and a shallow sinus in the lower lip. Oœcium large, rounded, nodular, and perforated. Avicularia rare, situated at the upper angle of the zoœcia, with the long, pointed mandible directed downwards and inwards.

Reference.—Hincks, Ann. and Mag. Nat. Hist., Oct. 1884.

Port Phillip Heads.

I have no doubt that this species is identical with the *S. subsinuata* of Hincks, although not altogether agreeing with his description or figure. The zoarium is loosely adnate; of a dark grey or purplish-grey color. The zoœcia are large, broad, convex, separated by distinct raised lines, irregular in shape and arrangement, frequently quadrate. The surface is, in my specimens, covered by a delicate, glistening epitheca, marked with dark lines and loops; beneath the epitheca the surface is nodular with perforations among the nodules. The oœcia are of large size, covered with the

epitheca, and marked in the same manner as the zoœcia. In a few of the zoœcia there is a single large avicularium situated at the upper angle.

Explanation of Figure.

Plate 138.—Fig. 5, portion of specimen, magnified; avicularia are shown in two of the zoœcia.

Plate 138, Figs. 6, 7.

SCHIZOPORELLA RIDLEYI (McG.).

Description.—Zoarium encrusting. Zoœcia rhomboidal or elongated, in radiating linear series, separated by slightly raised margins; surface when young smooth, when older deeply areolated at the edges; mouth semicircular above, straight below, with a small rounded sinus. Below the mouth a small, vertical, elliptical avicularium on an elevated part of the zoœcium. Oœcium rounded.

Reference.—P. H. MacGillivray, Trans. Roy. Soc. Vict., Oct. 1882; *S. marsupium*, Ridley, Proc. Zool. Soc. Lond., Jan. 1881.

Port Phillip Heads.

In young specimens the mouth, with its semicircular upper margin and straight lower lip with rounded sinus, is well seen, as well as the small, elliptical, sub-oral avicularium, situated on the raised semilunar portion of the zoœcium. In older and more calcified zoœcia this raised portion frequently becomes so developed as to obscure the view of the mouth and avicularium; in these also there is usually a series of deep grooves converging from the margin to the raised sub-oral portion.

Explanation of Figures.

Plate 138.—Fig. 6, group of young zoœcia, to show the form of the mouth and situation of sub-oral avicularium. Fig. 7, portion of an older specimen, showing the converging grooves and oœcia.

Plate 138, Fig. 8.

SCHIZOPORELLA ARACHNOIDES (McG.).

Description.—Zoarium encrusting. Zoœcia oval, distinct, convex, smooth; mouth arched above, with a deep, rounded sinus in the straight lower lip; a series of (usually) seven stiff spines, several of which, especially the lower, are situated at

a distance from the margin of the mouth. Oœcia rounded, smooth, the edge usually sculptured.

Reference.—P. H. MacGillivray, Tr. Roy. Soc. Vict., Oct. 1882.

Port Phillip Heads.

This very beautiful species is at once distinguished by the arrangement of the oral spines. The lowest on each side is situated below and to one side of the angle of the mouth, and several others are frequently situated at a little distance from the mouth margin. The edge of the oœcium is frequently sculptured as in *Microporella Malusii;* but it is as commonly quite plain.

Explanation of Figure.

Plate 138.—Fig. 8, small portion, magnified, showing the arrangement of the oral spines, and an oœcium, which in this specimen has a sculptured edge.

Plate 138, Fig. 9.

SCHIZOPORELLA CRYPTOSTOMA (McG.).

Description.—Zoarium encrusting. Zoœcia indistinct; surface tubercular and glistening; mouth with a large sinus in the lower lip; 4–6 articulated spines on the margin, the lower on one or both sides frequently larger; a large conical process rising from the centre of the lower margin of the mouth, and almost entirely concealing the oral sinus. Oœcia large, rounded, prominent, shining, the surface smooth, or with faint, converging lines. Avicularia of two kinds, either small, broad, and situated on a calcareous eminence usually by the side of the mouth, or of great size, with a long, narrow, acute mandible, nearly equalling the zoœcium in length.

Reference.—P. H. MacGillivray, Tr. Roy. Soc. Vict., Nov. 1884.

Port Phillip Heads, Mr. J. B. Wilson.

At first sight this species has a striking resemblance to a *Rhynchopora*, especially *R. longirostris* of Hincks, the large avicularia of which are very similar. The formation of the oral process, however, is quite distinct. It is not an outgrowth from the side of the mouth, but is a process springing from the lower margin below the sinus.

Explanation of Figures.

Plate 138.—Fig. 9, portion near the edge of the zoarium. Fig. 9*a*, another portion of the same specimen, showing the large avicularia.

PLATE 138, FIG. 10.

GEMELLIPORA STRIATULA (SMITT).

[Genus GEMELLIPORA (SMITT). (Sub-kingdom Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Family Escharidæ.)

Gen. Char.—Zoarium crustaceous, or erect and ramose. Mouth horse-shoe-shaped or pyriform, with a prominent denticle on each side for the articulation of the operculum; the lower lip with a deep sinus.]

DESCRIPTION.—Zoarium encrusting. Zoœcia irregularly shaped, elongated, usually attenuated downwards or pyriform, arranged more or less in linear series, distinct, very slightly prominent; surface glassy, marked with irregular, mostly transverse, fine striæ, and thickly punctate with small white-bordered pores; mouth horse-shoe-shaped above, with a large wide sinus below; at the junction of the sinus and upper part there is a prominent, sharp denticle on each side for the articulation of the operculum; a small, broadly-oval avicularium on a separate punctured area above the mouth. Oœcium large, slightly elevated, adpressed to the cell above, punctate, and with an avicularium on the summit.

REFERENCE.—Smitt, Floridan Bryozoa, Part ii., p. 37; *Lepralia striatula*, P. H. MacGillivray, Tr. Roy. Soc. Vict., July 1882.

Port Phillip Heads, on *Adeonella*, &c.

Forms thin silvery films on old zoaria of *Adeonellopsis mucronata*, *Australis*, and other calcareous polyzoa. Besides the small avicularia above the mouth and on the oœcia, there are occasionally others, precisely similar, situated at the summits of closed cells where there is no appearance of there ever having been an orifice. The special tracts in which the supra-oral avicularia are situated are evidently of the same nature as these closed cells.

EXPLANATION OF FIGURES.

PLATE 138.—Fig. 10, portion of specimen, magnified, showing two oœcia. Fig. 10*a*, portion of zoœcium, more highly magnified, to show the structure of the mouth.

The specimens and descriptions of the Polyzoa on this plate are from Mr. MacGillivray.

FREDERICK MCCOY.

ZOOLOGY OF VICTORIA

(Insects)

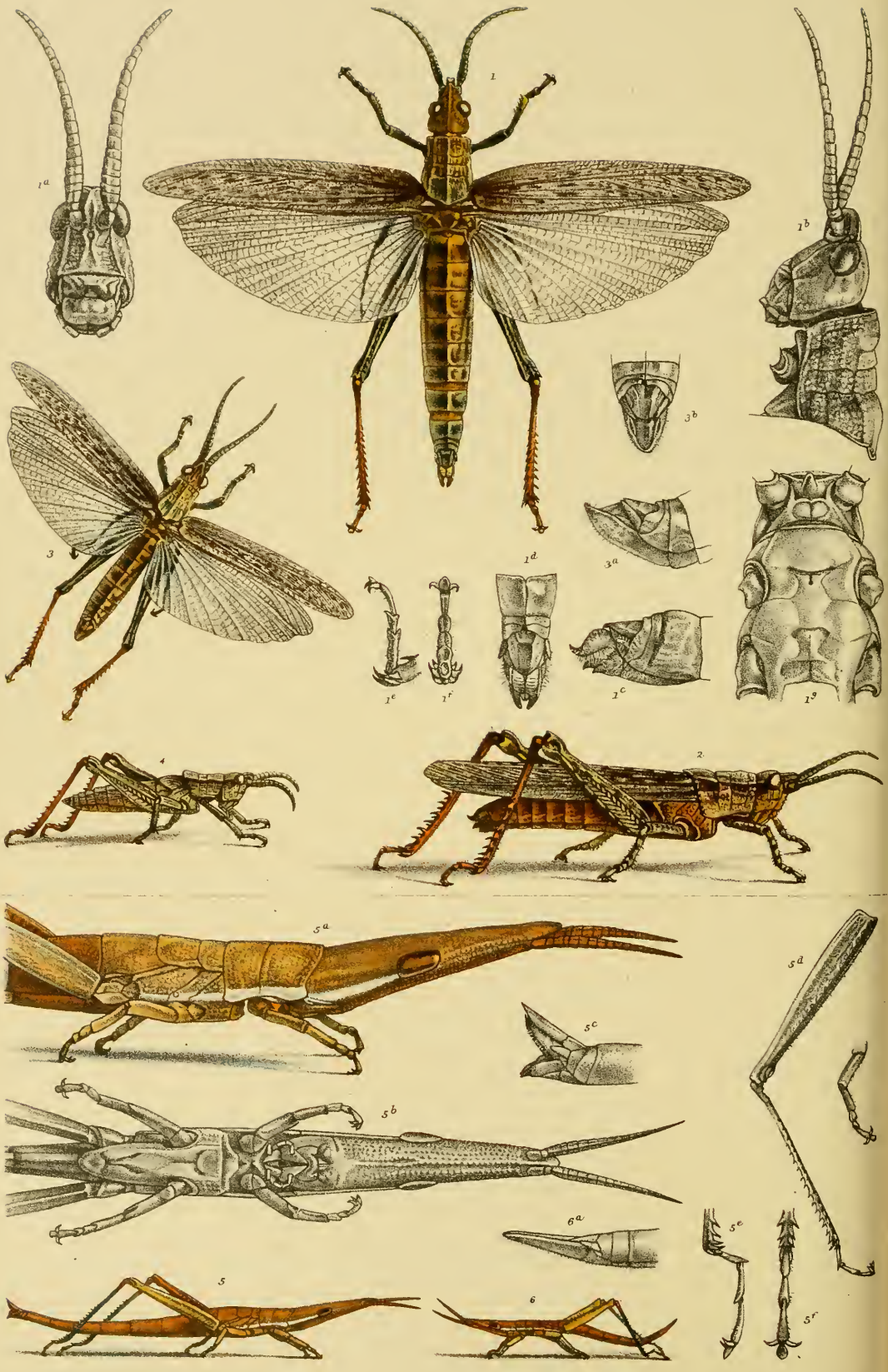

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PLATE 139, FIGS. 1-4.

OPSOMALA SORDIDA (AUD. SERV.).

THE DUSKY FLAT-HORNED LOCUST.

[Genus OPSOMALA (AUD. SERV.). (Sub-kingdom Articulata. Class Insecta. Order Orthoptera. Section Saltatoria. Family Acrididæ.)

Gen. Char.—Head large, conoidal, front extended in a horizontal, thick, conical point between the antennæ; anterior face extending very obliquely backwards and downwards, with four slender longitudinal keels, two close together in the middle, arising between the antennæ; the other pair, one on each side, arising between the eye and antennæ; eyes very large, prominent, placed obliquely near the anterior top of the head, close to base of antennæ; ocelli three, one in middle between the two keels, and one on each side above the base of the antennæ in front of the eyes; antennæ nearly as long as head and thorax, of numerous (about 23) joints, ensiform, with flattened upper and lower sides, usually widening abruptly from the third joint, and tapering to the end. Prothorax indistinctly tricarinate, with three or four transverse sulci, narrow, rounded above, slightly compressed, rounded or obtusely angular behind; presternum with one strong acutely conical spine in the middle; mesosternum and metasternum very broad, flat, and smooth; elytra narrow, lanceolate, rounded at tip, usually longer than the abdomen; wings slightly shorter than the elytra. Abdomen large, unicarinate above; appendages small. Legs: anterior and middle pairs small; posterior ones longer than the body, with thickened femora, and two rows of spines on distal half of tibiæ; tarsi slender, last joint elongate; cushion between the claws large.]

DESCRIPTION.—*Female:* Head and prothorax rugged, with granules, irregularly arranged in longitudinal rows; mesial keel on head and prothorax small, slightly marked; lateral keels on prothorax indistinct; transverse sulci on thorax small, the two posterior reaching the lateral margin, the two anterior shorter; prothorax transversely rounded, with an obtuse mucro behind; antennæ flattened, of 23 joints. *Color:* Head, thorax, anterior four legs, and abdomen dull brown, with tinges of bluish-grey; face and antennæ grey; hinder thighs mottled grey and cream color externally, dark greyish-blue on inner side; hind tibiæ pale testaceous red on inner side, paler on outer side, with the two rows of spines nearly black. Tegmina moderately translucent, very pale brownish-grey, with brown veins and numerous irregular, ill-defined, quadrate spots of dull pale brown; wings colorless, or with tinge of bluish-grey towards inner angle, with fine brown veins; abdomen smooth, glossy, of a richer brown than the body, and with cloudy patches of grey on hinder segments; upper pair of ovarian plates granulated, light cream color, with a strong median keel ending in the dark, pointed extremity; lower pair smoother, punctated, bicuspid, points dark; appendages very small. Length from frontal conical point to end of abdomen, 2 ins. 5 lines. Comparative measurements to length, taken as 100: Head, $\frac{10}{100}$; prothorax, $\frac{18}{100}$; antennæ, $\frac{30}{100}$; tegmina, $\frac{74}{100}$; width of tegmina, $\frac{15}{100}$; length of wings, $\frac{63}{100}$; hind femur, $\frac{48}{100}$; hind tibiæ, $\frac{17}{100}$; hind tarsi, $\frac{12}{100}$. *Male:* Similar to female, but much smaller; the upward curved sub-anal plate very large; appendages moderately long. The spotting of the tegmina darker and more distinct. Length from frontal point to end of abdomen, 1 in. 4 lines; proportional length of head, $\frac{15}{100}$; prothorax, $\frac{23}{100}$; tegmina, $\frac{96}{100}$; hind thigh, $\frac{54}{100}$; antennæ, $\frac{40}{100}$. Pupæ, 1 in. 2 lines long, have the wings 2 lines long; no ocelli; and the surface of the abdomen very rough, with longitudinal branching vermicular ridges, granules, and puncta.

REFERENCE.—Audinet Serville, Orthop., p. 592.

These flat-horned Locusts differ from the typical *Œdipoda* in the width and flatness of the joints of the antennæ, and in the roundness of the prothorax, and the great, single, conical spine on the middle of the presternum between the bases of the anterior pair of legs. They are entirely solitary, never forming flocks or crowds of individuals, and having no perceptible migratory habits. One, or a male and female, found occasionally on low bushes or tee-tree scrub around Melbourne. The terminal abdominal plates and appendages of the male and female, the structure of the hind thigh and the tarsi, and the stridulating drum over the base of the hind legs, agree with the general characters of the family. The males have the hind tibiæ of the same reddish tinge on the inner side as in the females, although M. Audinet Serville thought not. Some specimens are greyer, and others more brown in general tint, which agrees exactly with old stems of the tee-tree (*Leptospermum*), on which they are often found.

This species, although common, has not been figured before.

Explanation of Figures.

Plate 139.—Fig. 1, female, natural size, in flying position. Fig. 1*a*, front view of head, magnified two diameters, to show antennæ, eyes, and longitudinal ridges of face. Fig. 1*b*, side view of head and thorax, to show granulation and form and extent of transverse sulci, magnified two diameters. Fig. 1*c*, side view of plates at end of abdomen, magnified two diameters. Fig. 1*d*, same, viewed from above, showing four plates and small appendages, magnified two diameters. Fig. 1*e*, side view of tarsus, magnified two diameters. Fig. 1*f*, same, viewed from below. Fig. 1*g*, under-side of thorax, magnified two diameters. Fig. 2, female in walking position, viewed sideways, to show relative length of elytra and abdomen, natural size. Fig. 3, male, natural size, in flying position. Fig. 3*a*, side view of end of abdomen, magnified three diameters. Fig. 3*b*, same, viewed from above Fig. 4, pupa, walking position, natural size.

Plate 139, Figs. 5-6.

MESOPS PEDESTRIS (Erichson).

The Pedestrian Mid-Eyed Locust.

[Genus MESOPS (Aud. Serv.). Sub-kingdom Articulata. Class Insecta. Order Orthoptera. Section Saltatoria. Family Acrididæ.)

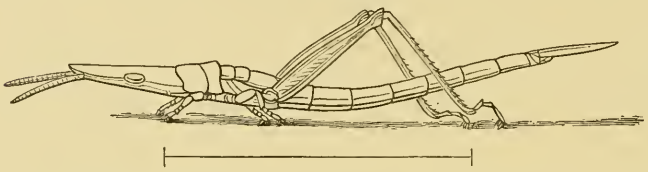
Gen. Char.—First and second pairs of feet very short; hind pair very large, with moderately elongate and swollen thighs, and with two rows of small spines on the middle and distal portion of upper surface of leg; tarsi slender, with a small cushion between the claws. Antennæ thick, moderately short, prismatic, of many wide joints. Head very long, conical, anterior face directed a little obliquely upwards and forwards from the horizontal.

Eyes moderately convex, placed far behind the antennæ and in front of prothorax, nearly in middle of side of head. Prothorax narrow, no wider than the head in front, short, semi-cylindrical, slightly keeled in the middle, without lateral keels. Presternum with a small conical spine between bases of anterior legs; mesosternum and metasternum narrow, widely channelled along middle. Elytra narrow, linear, only slightly opaque, shorter than abdomen (sometimes absent). Wings as long as the elytra (or sometimes absent). Abdomen very long, slender, cylindrical.]

Description.—Both sexes destitute of wings in the adult state, but with oblique lines on the sides of the mesothorax and metathorax, resembling the indications of wings in the pupæ of winged locusts. *Female:* Head, thorax, and abdomen moderately compressed, with a slightly marked keel from the tip of the snout to the sur-anal plate. Head, thorax, and abdomen minutely granular. Prothorax divided by a fine transverse sulcus a little behind the middle; metathorax divided similarly, a little in front of middle. Sub-anal plate less than half the length of the last normal joint of the abdomen, and projecting very slightly beyond the upper and lower pairs of plates. Lateral appendages very small. Antennæ flattened, 1st and 2nd joints narrow, 3rd and 4th joints widest; thence gradually tapering to the end. A prominent ridge extends from front of eye to tip of snout. First and second pairs of feet very small. A swollen tympanum at inner side of distal end of hind femora. Two rows of minute spines on upper surface of distal two-thirds of hind tarsi. Outer side of thighs convex, granular, with an upper keel and a lower, one bordered by a groove, on each side. Under side of head angularly keeled from tip of snout nearly to mouth. *Male:* Differing from female in much smaller size and in having a very long, compressed, sharp-pointed sub-anal plate, about as long as the last three normal joints of the abdomen. *Color:* Variable; frequently both sexes of a dull pea-green color, with a broad, distinct, white, satin-like band from behind the eye to the base of hind thigh, and sometimes continued along thigh to distal end; tarsi glaucous, reddish at base, with the spines black; antennæ testaceous. Other specimens are entirely testaceous reddish, and others greyish-brown, with the white band as before; but the inside of the base of the thigh usually brighter or redder testaceous than any other part. Some specimens have irregularly scattered black dots. *Measurements—Female:* Total length from front end of head to tip of sub-anal plate, 2 ins. 3 lines. Proportional measurements to total length, $\frac{15}{100}$; head, $\frac{22}{100}$; prothorax, $\frac{9}{100}$; mesothorax, $\frac{3}{100}$; metathorax, $\frac{10}{100}$; (dorsal surface of whole thorax, $\frac{22}{100}$); abdomen, $\frac{56}{100}$; hind femur, $\frac{27}{100}$; hind tibia, $\frac{25}{100}$; hind tarsus, $\frac{5}{100}$; middle femur, $\frac{5}{100}$; middle tibia, $\frac{4}{100}$; middle tarsus, $\frac{3}{100}$; anterior femur, $\frac{5}{100}$; anterior tibia, $\frac{4}{100}$; anterior tarsus, $\frac{4}{100}$; sub-anal plate, $\frac{3}{100}$. *Male:* Total length from front end of head to tip of sub-anal plate, 1 in. 5 lines. Proportional measurements to total length: Antennæ, $\frac{15}{100}$; head, $\frac{22}{100}$; prothorax, $\frac{10}{100}$; mesothorax, $\frac{2}{100}$; metathorax, $\frac{10}{100}$; (dorsal surface of whole thorax, $\frac{22}{100}$); abdomen, $\frac{57}{100}$; hind femur, $\frac{30}{100}$; hind tibia, $\frac{28}{100}$; hind tarsus, $\frac{6}{100}$; middle femur, $\frac{6}{100}$; middle tibia, $\frac{4}{100}$; middle tarsus, $\frac{3}{100}$; anterior femur, $\frac{5}{100}$; anterior tibia, $\frac{4}{100}$; anterior tarsus, $\frac{4}{100}$; sub-anal plate, $\frac{15}{100}$.

The most striking characteristic of the Locusts of this genus is the position of the eyes in the middle of the sides of the very long, slender, conical head, far removed from both the antennæ and the prothorax.

M. M. Charpentier and Audinet Serville long ago observed that the larvæ and pupæ of some species of *Truxalis* had a very long, compressed, pointed sur-anal plate over the other abdominal appendages, not present, or only of very reduced dimensions, in the adult; the latter writer believing that this curious structural peculiarity belonged only to the females, as it was wanting completely in a male pupa in his possession. The same fact may be observed in the present insect, in which the upper abdominal plate in the adult female, as figured in our plate, scarcely exceeds the lateral plates in length; but in the smaller individuals in the pupa state, the same plate is as long and sharp-pointed as the sub-anal plate of the males, equalling in length the $2\frac{1}{2}$ last joints of the abdomen (the 7th, 6th, and half of the 5th), as represented in the above woodcut. What can be the significance of this unusual change in relative size of this plate at different stages of development, it is impossible at present to suggest.



Pupa of female, twice the natural size, to show the temporarily long sur-anal plate. The line below shows the natural size.

The terminal portion of the antennæ, equalling about 4 of the preceding joints in length, has such obscure indications of joints that the number is somewhat doubtful.

Explanation of Figures.

Plate 139.—Fig. 5, female, natural size. Fig 5*a*, side view of head and thorax, magnified three diameters, showing structure of small mesothorax and large divided prothorax and metathorax, with oblique sulci indicative of traces of undeveloped wings and elytra. Fig. 5*b*, under view of same, showing small spine on presternum and wide channelled sternum behind. Fig. 5*c*, abdominal plates and appendages of same, magnified. Fig. 5*d*, hind leg, magnified, showing ridges, granules, and swollen tympanum near distal end. Figs. 5*e* and 5*f*, side and inner views of middle tarsi of same, more highly magnified. Fig. 5*g*, side view of anterior leg, similarly magnified. Fig. 6, male, natural size. Fig. 6*a*, sub-anal plate and abdominal appendages, magnified.

Frederick McCoy.

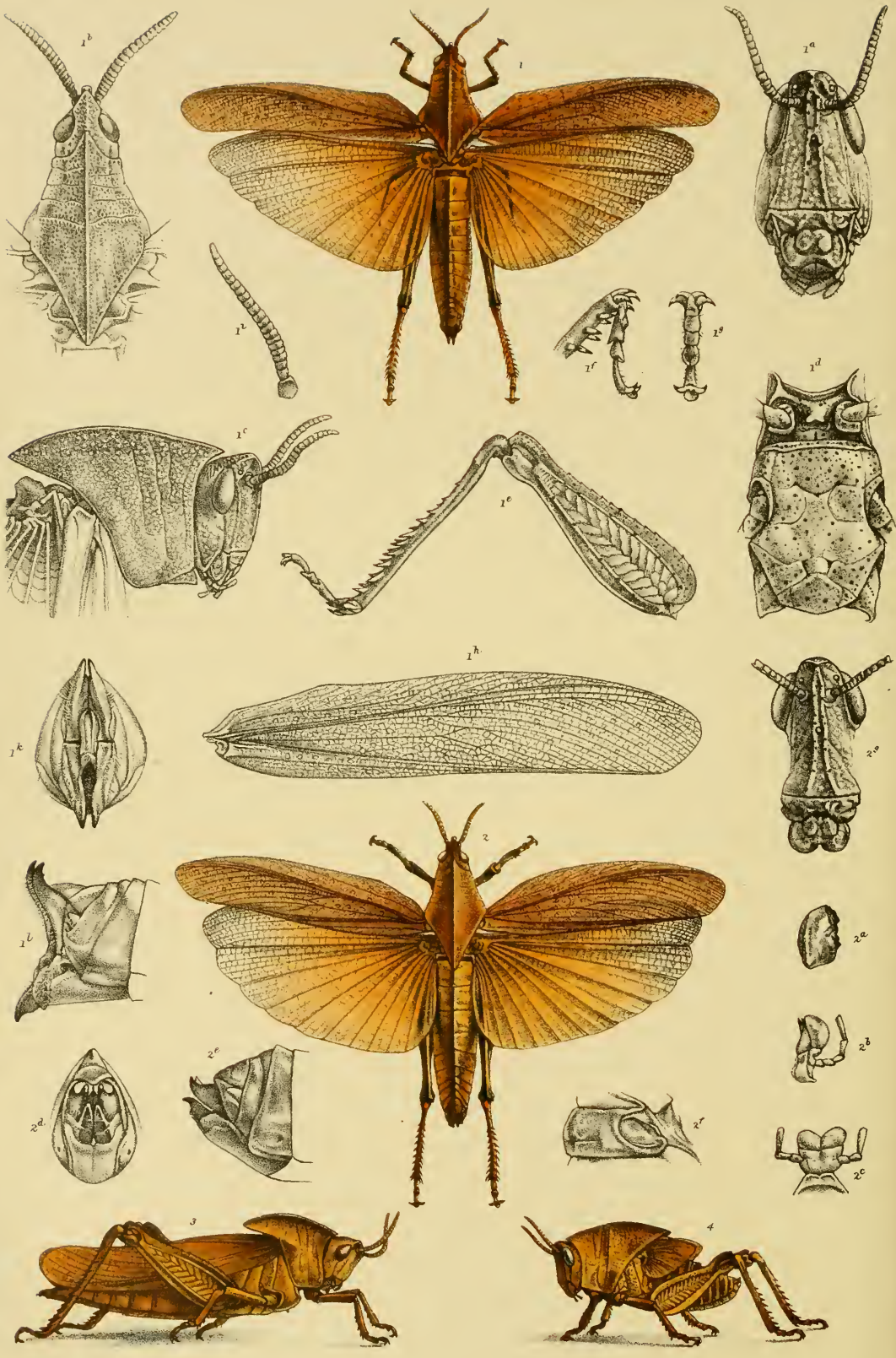

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Plate 140.

TROPINOTUS AUSTRALIS (Leach).

The Cinnamon Keel-backed Locust.

[Genus TROPINOTUS (Aud. Serv.). (Sub-kingdom Articulata. Class Insecta. Order Orthoptera. Section Saltatoria. Family Acrididæ.)

Gen. Char. — Head large, elongate; anterior face narrow in front, with flat converging sides, vertical, with two longitudinal approximate keels in the middle and one other on each side; front projecting forward between the antennæ in a slightly acute thick cone. Eyes oval, not very prominent; antennæ shorter than thorax, thick, of about 20 slightly flattened joints, arising very close together, filiform; palpi of slender joints. Thorax strongly compressed above, inversely boat-shaped, with a very large, median, dorsal, compressed, arched keel, extending in front over the head in a point, and from the metathorax in a point behind over the elytra beyond the base of the wings, the anterior and posterior lateral margins converging obliquely to those points, the posterior very acutely; presternum small, with one central, long, acutely-conical spine in middle, sometimes bifid at tip; meso- and meta-sternum very broad, flat, smooth. Elytra a little longer than the abdomen, with fine neuration; wings ample, a little shorter than the elytra. Abdomen large, with a strong, dorsal, median keel; appendages short, setaceous; sub-anal plate of male large, curved upwards, convex, triangular tip extending beyond the abdomen. Posterior legs large, thighs moderately thickened, with chevron marks on side; tibiæ, except at base, with two equal rows of tooth-like spines; tarsi 3-jointed; pads between claws small; maxillary palpi of 5 joints; labial palpi of 3 joints; maxillæ tridentate. South America, South Africa, and Australia.]

Description.—*Female:* Length from front of head to end of abdomen, 1 in. 9 lines. Proportional measurements to length (taken as 100): Length of head, $\frac{6}{100}$; prothorax, $\frac{38}{100}$; tegmina, $\frac{83}{100}$; wings, $\frac{78}{100}$; antennæ, $\frac{20}{100}$; hind thigh, $\frac{47}{100}$; hind tibiæ, $\frac{40}{100}$; width of tegmina, $\frac{20}{100}$. Head and thorax minutely and irregularly granulated. Antennæ of 23 joints, less than half the length of head and thorax. Elytra considerably longer than abdomen, narrow, oblong, obliquely truncated at distal end, translucent, but not so transparent as the wings, minutely netted. *Color:* Whole body, head, thorax, abdomen, legs, and elytra, light, dull cinnamon-brown, with minute, scattered, blackish speckles; wings with veins of the same color, and the membrane a little lighter and more pale yellowish-tawny at base, the anterior costal portion nearly like the tegmina. Legs and tarsi paler. *Male:* Like female in size, shape, and color, except the large sub-anal plate and longer lateral appendages.

Reference.—*Gryllus Australis*, Leach, Zool. Misc., v. i., p. 56, t. 24 = *Tropinotus cinnamonicus*, Serv., Hist. Nat. des Insect. Orthop., p. 620.

The *Tropidonoti*, or keel-backed Locusts, differ from ordinary Locusts in the great compression of the midline of the thorax into a high-arched prominent keel, extending over the head in front and over the base of the abdomen behind, from which the genus derives its name. The single median spine of the presternum, and the great compression of the narrow-keeled face in front, and the angular frontal projection of the head, are also peculiar characteristics of these insects, in which they approach the *Truxali*, or

Cone-headed Locusts. In habits they are like many other Locusts, chiefly found on the ground or low bushes, and laying their eggs in the earth. They are not, however, gregarious, nor migratory, being only found one here and there. The drum in first abdominal segment is large, and, as usual in the family, the two hinder segments of the sternum are very wide, flat, and smooth. The labrum, mandibles, maxillæ with their palpi, and the bilobed labium, agree with the character of those parts in the family generally.

The size of individuals of this species varies considerably, but the males are little less than the females, contrary to Audinet Serville's impression. Some specimens are lighter than others in color. The ocelli are very minute. The presternal spine is bifid at the tip.

Although not uncommon, it does not occur in the proportion of one to a hundred of the yellow-winged Locust, *Œdipoda musica*, and, like the *Opsomala*, has no gregarious habits, one or two individuals being found in one spot on the ground amongst the scrub or dwarf bushes around Melbourne. The female, when depositing her eggs, forces the abdomen an inch into the ground, making up for want of long ovipositor of the Grasshoppers.

Explanation of Figures.

Plate 140.—Fig. 1, female, natural size, flying. Fig. 1*a*, front view of head, magnified three diameters, to show the compressed face, four longitudinal keels, two eyes, three ocelli, and antennæ. Fig. 1*b*, head and thorax, viewed from above, magnified two diameters, to show granulation and transverse sulci. Fig. 1*c*, side view of head and thorax, to show nearly vertical line of face and keel-like extension of the metathorax over the bases of the elytra and wings, magnified two diameters. Fig. 1*d*, under-side of sternum, magnified two diameters, showing the narrow presternum, with the large bifid spine between the base of the anterior pair of legs, and the wide, smooth, meso- and meta-sternal parts, between the bases of the second and third pairs of legs. Fig. 1*e*, hind leg, magnified two diameters, showing the chevron marks on the thigh, and the two rows of coarse spines on the tibia, obsolete at base. Fig. 1*f*, side view of three-jointed tarsi, magnified three diameters. Fig. 1*g*, same, viewed from below, showing the apparent division of the basal joint and large pad between the claws. Fig. 1*h*, one of the elytra, magnified two diameters, to show the reticulation. Fig. 1*i*, one of the antennæ, magnified three diameters. Fig. 1*k*, terminal abdominal plates, viewed from behind, magnified three diameters. Fig. 1*l*, the same, viewed from the side. Fig. 2, male, natural size, in flying position. Fig. 2*a*, mandible, magnified three diameters. Fig. 2*b*, maxillæ, showing bifid tip, large hood, and slender palpi, magnified three diameters. Fig. 2*c*, bilobed labium, with three-jointed palpi, magnified three diameters. Fig. 2*d*, sub-anal plate and appendages at end of abdomen, viewed from behind, magnified three diameters. Fig. 2*e*, same, viewed from the side. Fig. 2*f*, drum in first abdominal segment, magnified two diameters. Fig. 2*g*, front view of compressed head, magnified three diameters. Fig. 3, specimen in walking position, with the wings closed, viewed sideways, natural size. Fig. 4, immature pupa, in the walking position, viewed from the side, to show the very short elytra and undeveloped wings, natural size.

Frederick McCoy.

CONTENTS OF DECADES.

N.B.—The originals of all the Figures are in the National Museum, Melbourne.

DECADE I.

PLATE 1.—The Black Snake (Pseudechys porphyriacus, Shaw sp.).
PLATE 2.—The Copper-head Snake (Hoplocephalus superbus, Günth.).
PLATE 3.—The Tiger Snake (Hoplocephalus curtus, Schl. sp.).
PLATE 4.—The Australian Bream (Chrysophrys Australis, Günth.).
PLATE 5.—The Spiny-sided Butterfly-Gurnard (Lepidotrigla Vanessa, Rich. sp.).
PLATE 6.—The Kumu Gurnard (Trigla Kumu, Lesson and Garn.).
PLATE 7.—The Australian Giant Earth-worm (Megascolides Australis, McCoy).
PLATE 8.—Lewin's Day-moth (Agarista Lewini, Boisd.).
The Loranthus Day-moth (Agarista Casuarinæ, Scott).
The Vine Day-moth (Agarista Glycine, Lewin sp.).
PLATE 9.—Pieris (Thyca) Harpalyce (Don. sp.).
PLATE 10.—Pieris (Thyca) Aganippe (Don. sp.).

DECADE II.

PLATE 11.—The Little Whip Snake (Hoplocephalus flagellum, McCoy). The White-lipped Snake (Hoplocephalus coronoides, Günth.).
PLATE 12.—The Death Adder (Acanthophis Antarctica, Shaw sp.).
PLATE 13.—The Carpet Snake (Morelia variegata, Gray).
PLATE 14.—The Gippsland Perch (Lates colonorum, Günth.).
PLATE 15.—The Murray Lobster (Astacopsis serratus, Shaw sp.).
PLATE 16.—The Salmon Arripis (Arripis truttaceus, Cuv. sp.). Adult.
PLATE 17.—Ditto of the younger forms and coloring.
PLATE 18.—The Horse Mackerel (Trachurus trachurus, Lin. sp.).
PLATE 19.—The Small-scaled Rock Cod (Lotella callarias, Günth.).
PLATE 20.—The Australian Rock Cod (Pseudophysis barbatus, Günth.).

DECADE III.

PLATE 21.—The Sea-Leopard Seal (Stenorhynchus leptonyx, de Blainv. sp.).
PLATE 22.—The Yellow-sided Dolphin (Delphinus Novæ Zealandiæ, Quoy and Gaim.).
PLATE 23.—The Common Brown Snake (Diemenia superciliosa, Fisch.).
The Small-scaled Brown Snake (Diemenia microlepidota, McCoy).
The Shield-fronted Brown Snake (Diemenia aspidorhyncha, McCoy).
PLATE 24.—Catenicella margaritacea (Busk).—C. plagiostoma (Busk).—C. ventricosa (Busk).—C. hastata (Busk.)—C. rufa (McG.).—C. cribraria (Busk).—C. alata (Wyv. Thomson).—C. lorica (Busk).—C. formosa (Busk).—C. elegans (Busk).—C. perforata (Busk).—C. Buskii (Wyv. Thomson).—C. Hannafordi (McG.).—C. crystallina (Wyv. Thomson).—C. carinata (Busk).—C. aurita (Busk).—C. geminata (Wyv. Thomson).—C. cornuta (Busk).—C. intermedia (McG.)
PLATE 25.—Membranipora membranacea (Linn. sp.).—M. perforata (McG.).—M. ciliata (McG.).—M. mamillaris (McG.).—M. umbonata (Busk).—M. pilosa (Linn. sp.).—M. cervicornis (Busk).
PLATE 26.—Membranipora dispar (McG.).—M. Woodsii (McG.).—M. lineata (Linn. sp.).—M. Rosselii (Audouin sp.).—M. Lacroixii (Savigny sp.).
PLATE 27.—The Australian Rockling (Genypterus Australis, Cast.).
The Yarra Blackfish (Gadopsis gracilis, McCoy).
PLATE 28.—The Southern Mackerel (Scomber pneumatophorus, De la Roche).
PLATE 29.—The Yabber Crayfish (Astacopsis bicarinatus, Gray sp.).
PLATE 30.—The Large Wattle Goat-Moth (Zeuzera Eucalypti, Boisd. Herr.-Schæf.).

DECADE IV.

PLATE 31.—The Australian Sea-Bear or Fur-Seal (Euotaria cinerea, Péron sp.).
PLATE 32.—The Two-hooded Furina-Snake, Furina bicucullata (McCoy).
PLATE 33.—The Banded Red Gurnet-Perch (Sebastes percoides, Solander sp.).
PLATE 34.—The Angel-fish (Rhina squatina, Lin. sp.).
PLATE 35.—Lepralia circinata (McG.).—L. Cecilii (Aud.).—L. diaphana (McG.).—L. marsupium (McG.).—L. subimmersa (McG.).—L. anceps (McG.).—L. Maplestonei (McG.).
PLATE 36.—Lepralia vittata (McG.).—Membranipora perforata. Lepralia Brogniartii (Aud.).—L. elegans (McG.).—L. pertusa (Esper. sp.).—L. Malusii (Aud. sp.).—L. lunata (McG.).
PLATE 37.—Lepralia ciliata (Linn. sp.).—L. trifolium (McG.).—L. cheilodon (McG.).—L. canaliculata (McG.).—L. larvalis (McG.).—L. diadema (McG.).—L. papillifera (McG.).—L. Ellerii (McG.).
PLATE 38.—Lepralia monoceros (Busk).—L. excavata (McG.).—L. vitrea (McG.).—L. megasoma (McG.).—L. Schizostoma (McG.).—L. Botryoides (McG.).—L. ferox (McG.).—L. pellucida (McG.).
PLATE 39.—Crisia Edwardsiana (D'Orb. sp.).—C. biciliata (McG.).—C. acropora (Busk).—C. setosa (McG.).—C. tenuis (McG.).
PLATE 40.—Saunders' Case-Moth (Metura elongata, Saunders sp.).
The Lictor Case-Moth (Entometa ignobilis, Walk.).

DECADE V.

PLATE 41.—The Lace Lizard (Hydrosaurus varius, Shaw sp.).
PLATE 42.—The Spotted Marsh-Frog (Limnodynastes Tasmaniensis, Günth.).—The Common Sand-Frog (Limnodynastes dorsalis, Gray).
PLATE 43.—The Carpet Shark (Crossorhinus barbatus, Lin. sp.).—The Seven-gilled Shark (Notidanus [Heptanchus] Indicus, Cuv.).
PLATE 44.—The Barracouta (Thersites atun, Cuv.).—The Tunny (Thynnus Thynnus, Lin. sp.).
PLATE 45.—Flustra denticulata (Busk).—Carbasea episcopalis (Busk).—C. dissimilis (Busk).—C. indivisa (Busk).—C. elegans (Busk).—C. pisciformis (Busk).
PLATE 46.—Spiralaria florea (Busk).—Diachoris Magellanica (Busk).—D. spinigera (P. McGil.).—Dimetopia spicata (Busk).—D. cornuta (Busk).—Didymia simplex (Busk).—Calwellia bicornis (Wyv. Thomson).
PLATE 47.—Dictyopora cellulosa (P. McGil.).
PLATE 48.—Eschara obliqua (P. McGil.).—E. dispar (P. McGil).—E. gracilis (Lamx.).—E. platalea (Busk).—E. quadrata (P. McGil.)—E. mucronata (P. McGil.).—Caleschara denticulata (P. McGil.).
PLATE 49.—Cellaria fistulosa (Linn.).—C. hirsuta (P. McGil.).—C. tenuirostris (Busk.).—C. gracilis (Busk).—Nellia oculata (Busk).—Tubucellaria hirsuta (Busk).
PLATE 50.—The Great Black, or Manna Cicada (Cicada mœrens, Germ.).—The Great Green Cicada (Cyclochila Australasiæ, Donov. sp.).

DECADE VI.

PLATE 51.—The Victorian Rhodona (Rhodona Officeri, McCoy).
PLATE 52.—The Black and White Ringed Snake (Vermicella annulata, Gray).
PLATE 53.—The Green and Golden Bell-Frog (Ranoidea aurea, Less. sp.).
PLATES 54-55.—The Australian Aulopus (Aulopus purpurisatus, Rich.).
PLATE 56.—The Hammer-headed Shark (Zygæna malleus, Shaw).—The Common Australian Saw-Fish (Pristiophorus nudipinnis, Günth.).
PLATE 57.—Biflustra perfragilis (McGil.).—B. delicatula (Busk).
PLATE 58.—Cellularia cuspidata (Busk).—Menipea crystallina (Gray sp.).—M. cyathus (Wyv. Thomson).—M. cervicornis (McGil.)—M. tricellata (Busk).—M. Buskii (Wyv. Thomson).
PLATE 59.—Bicellaria tuba (Busk).—B. grandis (Busk).—B. ciliata (Linn).—B. turbinata (McGil.).—Stirparia annulata (Map.).—Bugula neritina (Linn.).
PLATE 60.—Steganoporella magnilabris (Busk. sp.).—Petralia undata (McGil.).

DECADE VII.

PLATE 61.—The Tuberculated Argonaut (Argonauta oryzata, Meusch.).
PLATE 62.—The same seated in its so-called shell or Paper-Nautilus.
PLATE 63.—The Blue-spotted Eagle-Ray (Myliobatis Australis, Macleay).
PLATE 64.—The Long-toothed Bull-Shark (Odontaspis taurus, Raf.).—The Australian Tope Shark (Galeus Australis, Macleay).
PLATE 65.—The Leafy Sea-Dragon (Phyllopteryx foliatus, Shaw sp.).—The Short-headed Sea-horse (Hippocampus breviceps, Pet.)
PLATE 66.—Dictyopora grisea (Lamx. sp.).—D. albida (Kirch.)—(Var. avicularis, P. McGill.).
PLATE 67.—D. Wilsoni (P. McGill.).
PLATE 68.—Idmonea Milneana (d'Orb.).—I. contorta (P. McGill.).—I. radians (Lamk.).
PLATES 69–70.—The Violet-shouldered Phasma (Tropidoderus iodomus, McCoy).—The Red-shouldered Phasma (Tropidoderus rhodomus, McCoy).

DECADE VIII.

PLATE 71.—The Australian Sea-Bear or Fur-Seal (Euotaria cinerea, Péron sp.).
PLATE 72.—The Northern Blue-tongued Lizard (Cyclodus gigas, Bodd. sp.).
PLATE 73.—The Ludrick (Girella simplex, Rich. sp.).
PLATE 74.—The White Shark (Carcharodon Rondeletii, Müll. and Hen.).
PLATE 75.—The Picked Dog-Fish (Acanthias vulgaris, Linn. sp.).
PLATES 76–77.—The Australian Tooth-cupped Cuttlefish (Sepioteuthis Australis, Quoy and Gaim.).
PLATE 78.—Bugula robusta (P. McGil.).—B. cucullata (Busk).—B. dentata (Lamx.).—B. avicularia (Pall.).
PLATE 79.—The Violet-winged Phasma (Acrophylla violascens, Leach sp.).
PLATE 80.—The Large Pink-winged Phasma (Podacanthus typhon, Gray).

DECADE IX.

PLATE 81.—The Gippsland Water Lizard (Physignathus Lesueri, Gray)—(Var. Howitti, McCoy).
PLATES 82–83.—The Murray Tortoise (Chelymys Macquaria, Cuv. sp.).
PLATE 84.—The Murray Golden Perch (Ctenolates ambiguus, Rich. sp.).
PLATES 85–86.—The Murray Cod-Perch (Oligorus Macquariensis, Cuv. and Val. sp.).
PLATE 87.—The Australian Smooth-Hound (Mustelus Antarcticus, Günth.).
PLATE 88.—The Thresher, or Long-tailed Shark (Alopecias vulpes, Linn. sp.).
PLATE 89.—Catenicella intermedia (P. McG.).—C. amphora (Busk).—C. Wilsoni (P. McG.).—C. pulchella (Map.).—C. utriculus (P. McG.).
PLATE 90.—Catenicella fusca (P. McG.).—C. umbonata (Busk).—C. cornuta (Busk).

DECADE X.

PLATE 91.—Gymnobelideus Leadbeateri (McCoy).
PLATES 92–93.—The Long-necked River Tortoise (Chelodina longicollis, Shaw sp.).
PLATE 94.—Opercula of Retepora.
PLATE 95.—Retepora porcellana (P. McGil.).—R. avicularis (P. McGil.).—R. fissa (P. McGil.).
PLATE 96.—Retepora monilifera (P. McGil.).
PLATE 97.—Retepora monilifera (P. McGil.).—R. formosa (P. McGil.).—R. carinata (P. McGil.).
PLATE 98.—Retepora Phœnicea (Busk).—R. aurantiaca (P. McGil.).
PLATE 99.—Retepora granulata (P. McGil.).—R. tessellata (Hincks).—R. serrata (P. McGil.).
PLATE 100.—Goniocidaris tubaria (Lam.).

The foregoing ten Decades form Vol. I.

DECADE XI.

PLATE 101.—The Luth, or Leathery Turtle (Sphargis coriacea, Linn. sp.).
PLATE 102.—The Rugged Stump-tail, or Shingle-back, Lizard (Trachydosaurus rugosus, Gray).
PLATE 103.—The Blackish Australian Worm-Snake (Typhlops nigrescens, Gray sp.).
PLATE 104.—The Basking Shark (Cetorhinus maximus, Linn. sp.).
PLATE 105.—Cellaria rigida (McG.).—Tubucellaria cereoides (Ellis and Solander).—Urceolipora dentata (McG.)—U. nana (McG.).
PLATE 106.—Amphiblestrum punctigerum (Hincks). — A. Flemingii (Busk). — A. permunitum (Hincks).—Pyripora crassa (McG.).—P. catenularia (Jameson).—P. polita (Hincks).—Electra flagellum (McG.). — Bathypora porcellana (McG.).—Biflustra papulifera (McG.).—B. bimamillata (McG.).
PLATE 107.—Catenicellopsis pusilla (J. B. Wilson). — C. delicatula (J. B. Wilson). — Calpidium ponderosum (Goldstein sp.).
PLATE 108.—Calpidium ornatum (Busk).—Chlidonia dædala (Wyv. Thomson).
PLATE 109.—The Great Green Gum-tree Grasshopper (Locusta vigentissima, Serv.).
PLATE 110.—The Australian Yellow-winged Locust (Œdipoda musica, Fab. sp.).

DECADE XII.

PLATE 111.—The Blood-sucker (Grammatophora muricata, Shaw, sp.).
PLATE 112.—The Southern Chimæra (Callorhynchus antarcticus, Lacép. sp.).
PLATE 113.—The Port Jackson Shark, or Bull-dog Shark (Heterodontus Phillipi, Lacép. sp.).
PLATE 114.—The Australian Rough Fish (Trachichthys Australis, Shaw).
PLATE 115.—The Skip-jack Pike (Lanioperca mordax, Günth.).
PLATE 116.—Beania mirabilis (Johnst.).—Mucronella tricuspis (Hincks).—M. lævis (P. McG.).—M. vultur (Hincks).—Cyclicopora longipora (P. McG.).
PLATE 117.—Beania decumbens (P. McG.). — B. costata (Busk sp.). — B. Crotali (Busk sp.). — B. radicifera (Hincks sp.).—Amphiblestrum patellarium (Moll sp.).
PLATE 118.—Hornera foliacea (P. McG.).—H. robusta (P. McG.).
PLATE 119.—The Smaller Green Gum-tree Grasshopper (Phaneroptera valida, Walk.).
PLATE 120.—The Thirty-two Spotted Grasshopper (Phaneroptera [Ephippitytha] triginti duoguttata, Serv.).

DECADE XIII.

PLATE 121.—The Bearded Lizard (Grammatophora barbata, Kaup).
PLATE 122.—The Southern Silver Ribbon-fish (Trachypterus tœnia, Bloch).
PLATE 123.—The Two-pronged Toad-fish (Chironectes bifurcatus, McCoy).
PLATE 124.—Brown's Tooth-brush Leather-jacket (Monacanthus Browni, Rich, sp.).
PLATE 125.—The Horse-shoe-marked Leather-jacket (Monacanthus hippocrepis, Quoy and Gaim., sp.).
PLATE 126.—Maplestonia cirrata (P. McG.).—Scrupocellaria cyclostoma (Busk).—S. obtecta (Haswell).—S. cervicornis (Busk).—S. scrupea (Busk).—S. ornithorhynchus (Wyv. Thom.).
PLATE 127.—Membranipora pyrula (Hincks).—M. corbula (Hincks).—M. inarmata (Hincks).—M. pectinata (P. McG.).—M. serrata (P. McG.).—M. ciliata (P. McG.).—Amphiblestrum albispinum (P. McG.).—Membranipora spinosa (Quoy and Gaim.).
PLATE 128.—Cellepora speciosa (P. McG.).—C. serratirostris (P. McG.).—C. tridenticulata (Busk).
PLATE 129.—The Netted Acripeza (Acripeza reticulata, Guérin).
PLATE 130.—The Broad-styled Mantis (Mantis latistylus, Serv.).

DECADE XIV.

PLATE 131.—The Southern, or Blotched, Blue-tongued Lizard (Cyclodus nigroluteus, Quoy and Gaim. sp.).
PLATE 132.—The Thick-tailed Gecko (Phyllurus Miliusii, Bory).—The Marbled Gecko (Diplodactylus marmoratus, Gray).
PLATE 133.—Ray's Sea Bream (Brama Rayi, Bloch).
PLATE 134.—Bleeker's Parrot-fish (Labrichthys Bleekeri, Cast.).
PLATE 135.—The Black-finned Half-beak, or Sea Gar-fish (Hemiramphus intermedius, Cant.).—The Saury Pike (Scomberesox saurus, Bloch, sp.; var. Forsteri, Cuv. and Val.).
PLATE 136.—Caberea rudis (Busk).—C. grandis (Hincks).—Canda arachnoides (Lamx.).—C. tenuis (P. McG.).
PLATE 137.—Caberea Darwinii (Busk).—C. glabra (P. McG.)—Ætea dilatata (Busk).—Æ. anguina (Linn. sp.).
PLATE 138.—Schizoporella punctigera (P. McG.). — S. lata (P. McG.).— S. triangula (Hincks). — S. dædala (P. McG.).— S. subsinuata (Hincks).— S. Ridleyi (P. McG.).—S. arachnoides (P. McG.).—S. cryptostoma (P. McG.).—Gemellipora striatula (Smitt).
PLATE 139.—The Dusky Flat-horned Locust (Opsomala sordida, Aud. Serv.). The Pedestrian Mid-Eyed Locust (Mesops pedestris, Erichson).
PLATE 140.—The Cinnamon Keel-backed Locust (Tropinotus Australis, Leach).

CONTENTS OF DECADE XIV.

N.B.—The originals of all the Figures are in the National Museum, Melbourne.

PLATE 131.—The Southern or Blotched Blue-tongued Lizard (Cyclodus nigroluteus, Quoy and Gaim. sp.).

PLATE 132.—The Thick-tailed Gecko (Phyllurus Miliusii, Bory).—The Marbled Gecko (Diplodactylus marmoratus, Gray).

PLATE 133.—Ray's Sea Bream (Brama Rayi, Bloch).

PLATE 134.—Bleeker's Parrot-fish (Labrichthys Bleekeri, Cast.).

PLATE 135.—The Black-finned Half-beak, or Sea Gar-fish (Hemiramphus intermedius, Cant.).—The Saury Pike (Scomberesox saurus, Bloch, sp.; var. Forsteri, Cuv. and Val.).

PLATE 136.—Caberea rudis (Busk).—C. grandis (Hincks).—Canda arachnoides (Lamx.).—C. tenuis (P. McG.).

PLATE 137.—Caberea Darwinii (Busk).—C. glabra (P. McG.).—Ætea dilatata (Busk).—Æ. anguina (Linn. sp.).

PLATE 138.—Schizoporella punctigera (P. McG.).—S. lata (P. McG.).—S. triangula (Hincks).—S. dædala (P. McG.).—S. subsinuata (Hincks).—S. Ridleyi (P. McG.).—S. arachnoides (P. McG.)—S. cryptostoma (P. McG.).—Gemellipora striatula (Smitt).

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MARY D. ROGICK

Natural History of Victoria.

PRODROMUS

OF THE

ZOOLOGY OF VICTORIA;

OR

FIGURES AND DESCRIPTIONS OF THE LIVING SPECIES OF ALL CLASSES

OF THE

VICTORIAN INDIGENOUS ANIMALS.

DECADE XV.

BY

FREDERICK McCOY, C.M.G., M.A., Sc. D. Cantab., F.R.S.,

HONORARY MEMBER OF THE CAMBRIDGE PHILOSOPHICAL SOCIETY; HONORARY ACTIVE MEMBER OF THE IMPERIAL SOCIETY OF NATURALISTS OF MOSCOW; CORRESPONDING MEMBER OF THE ZOOLOGICAL SOCIETY OF LONDON; HONORARY MEMBER OF THE ROYAL SOCIETY OF NEW SOUTH WALES; HONORARY FELLOW OF THE GEOLOGICAL SOCIETY OF EDINBURGH; HONORARY MEMBER OF THE GEOLOGICAL SOCIETY OF MANCHESTER, ETC., ETC., ETC.

AUTHOR OF "SYNOPSIS OF THE CARBONIFEROUS LIMESTONE FOSSILS OF IRELAND;" "SYNOPSIS OF THE SILURIAN FOSSILS OF IRELAND;" "CONTRIBUTIONS TO BRITISH PALÆONTOLOGY;" ONE OF THE AUTHORS OF SEDGWICK AND McCOY'S "BRITISH PALÆOZOIC ROCKS AND FOSSILS;" "PRODROMUS OF THE PALÆONTOLOGY OF VICTORIA," ETC.

PROFESSOR OF NATURAL SCIENCE IN THE MELBOURNE UNIVERSITY.
GOVERNMENT PALÆONTOLOGIST, AND DIRECTOR OF THE NATIONAL MUSEUM OF MELBOURNE, ETC.

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ADVERTISEMENT.

It having been considered desirable to ascertain accurately the natural productions of the Colony of Victoria, and to publish works descriptive of them, on the plan of those issued by the Governments of the different States of America, investigations were undertaken, by order of the Victorian Government, to determine the Geology, Botany, and Zoology of the Colony, to form collections illustrative of each for the public use, and to make the necessary preparations for such systematic publications on the subject as might be useful and interesting to the general public, and contribute to the advancement of science.

As the geological and botanical investigations have already approached completion, and their publication is far advanced, it has been decided now to commence the publication of the third branch completing the subject, namely, that of the Zoology or indigenous members of the different classes of the animal kingdom.

The Fauna not being so well known as the Flora, it was a necessary preliminary to the publication to have a large number of drawings made, as opportunity arose, from the living or fresh examples of many species of reptiles, fish, and the lower animals, which lose their natural appearance shortly after death, and the true characters of many of which were consequently as yet unknown, as they had only been described from preserved specimens. A Prodromus, or preliminary issue, in the form of Decades, or numbers of ten plates, each with its complete descriptive letterpress, will be published, of such illustrations as are ready, without systematic order or waiting for the completion of any one branch. The many good observers in the country will thus have the means of accurately identifying various natural objects, their observations on which, if recorded and sent to the National Museum, where the originals of all the figures and descriptions are preserved, will be duly acknowledged, and will materially help in the preparation of the final systematic volume to be published for each class when it approaches completion.

Natural History of Victoria.

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M DCCC LXXXVII.

PREFACE.

—o—

This fifteenth Decade continues the illustrations of Victorian Reptiles by figures, for the first time of the colours of life, on Plate 141, of the *Egernia*, or Spiny-ridged Lizard; and, on Plate 142, of the *Pseudechys Australis*, a very deadly snake confined in Victoria to the hot northern boundary, where it is usually confounded with the Brown Snake (*Diemenia*), figured on Plate 23 of our third Decade, although really most allied to the equally fatal Black Snake (*Pseudechys porphyriacus*), figured on Plate 1 of the first Decade.

The illustrations of the Victorian Fishes are continued with, on Plate 143, one of the numerous "Leather Jackets" (*Monacanthus Peronii*) of our coasts, not recognisably figured before; and, on Plate 144, of the first occurrence in Australia of the curious "Spinose Shark," *Echinorhinus spinosus*, of which the previously published figures are very erroneous.

Plate 145 gives the most nearly complete figure yet published of Banks' Oar-Fish (*Regalecus Banksi*), a creature of extremely rare occurrence, and most probably the "Sea Serpent" of mariners.

The next three plates continue the illustrations of the Polyzoa so abundant on our coasts, the descriptions and specimens of which Mr. MacGillivray gives for this work and the National Museum.

Plates 149 and 150 give full structural details of the Common Melbourne Crawfish, or Spiny Rock Lobster, which has not been figured before, and which I have been at great trouble to prove identical with that common at the Cape of Good Hope, although quite different from that of Sydney and other more northern localities. This "Southern" species abounds in Tasmania, New Zealand and the Island of St. Paul, as well as at the Cape of Good Hope.

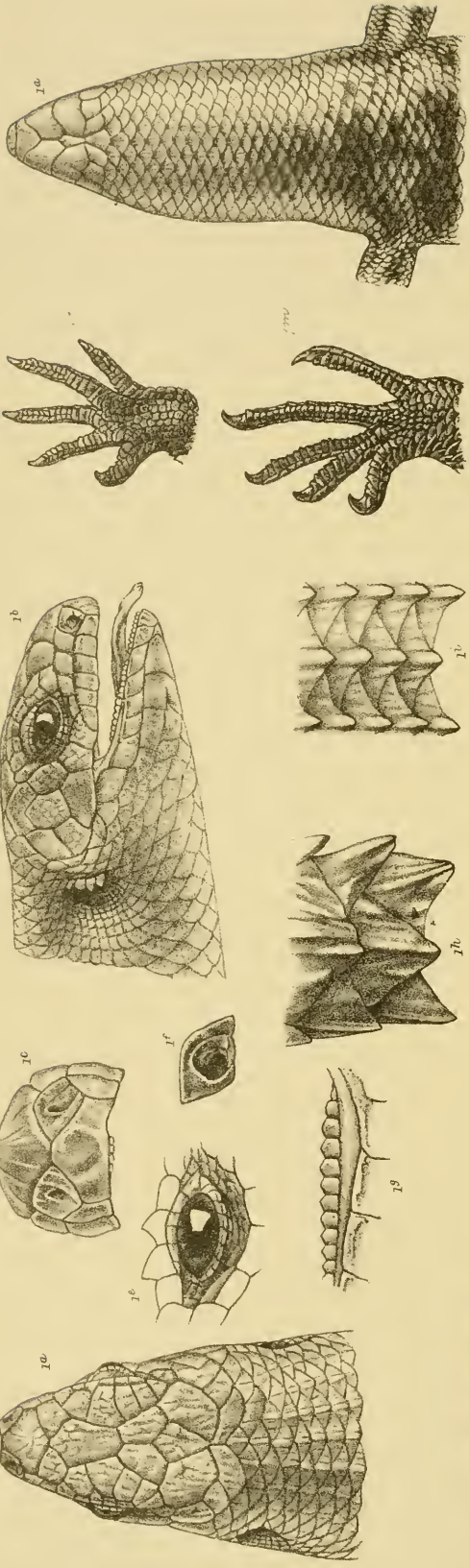
The succeeding decades will illustrate as many different genera as possible, and will deal first, usually, with species of some special interest and of which good figures do not exist or are not easily accessible.

Frederick McCoy.

October, 1887.

ZOOLOGY OF VICTORIA

(Reptiles)



Dr J J Wild del et lith

Prof McCoy direct

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PLATE 141.

EGERNIA CUNNINGHAMI (GRAY).

THE SPINY-RIDGED LIZARD.

[Genus EGERNIA (GRAY). (Sub-kingdom Vertebrata. Class Reptilia. Order Sauria. Sub-order Leptoglossæ. Tribe Geissosaura. Family Scincidæ.)

Gen. Char.—Head semi-rhomboidal, thick, flattened above, narrowed and rounded in front; shields convex, rugged; nasals ovato-triangular, nearly touching above; nostrils large, round, with prominent edges, with curved groove behind; supranasal none; rostral triangular; internasal large, rhomboidal, as long as broad; fronto-nasals rhombic, separate, lateral; frontal moderate, elongate, narrow behind, hexagonal; fronto-parietals two, contiguous in front, diverging behind to receive the anterior part of the interparietal, which is like the frontal but smaller; parietals moderate, semi ovate; a row of 6 or 7 large temporal shields between the fronto-nasals and parietals over the eye; orbit without any scales between it and the hinder labial plates; eyelids distinct, lower eyelid scaly; ear-opening large, oval, with four large, pointed, lobe-like scales on anterior edge; tongue thin, flat, wide, notched at tip. Body fusiform, sides rounded; tail cylindrical, gradually tapering, conical, as long as the body. Legs four, strong; toes long, slender, compressed, unequal, clawed. Scales thick, bony: of back, sides, and upper part of limbs broad, hexagonal, each with a strong, central keel ending posteriorly in a strong spine directed backwards and upwards; those of the six rows on tail much the largest; those of nape with 3 or 5 longitudinal grooves; those of throat and belly broad, thin, smooth, hexagonal or ovate. Teeth large. Australia.]

DESCRIPTION.—*Colour:* Above, brownish-olive, irregularly mottled with blackish-brown and whitish on the sides; head brown; chin and throat yellowish-white or grey; under surface of chest, belly, and tail yellowish and greyish-white, with an olive tint on the sides and strongly mottled with blackish-brown. A variable number of small angular white spots in some specimens on flanks, tail, and upper side of legs. Tongue greyish-blue. Iris dark-brown. About 20 rows of spines directed backwards, forming as many narrow, prominent ridges on upper surface of body; about 7, stronger, with much larger and more elevated spines on tail, and 5 or 6 smaller, spinose ridges on upper aspect of each leg; scales on back of neck not ridged, nor spinose, but with 3 or 5 longitudinal grooves; scales of under side of throat, breast, belly, and tail smooth, with thin, rounded, imbricating edges, and a few faint, longitudinal ridges. *Measurements:* Length, 1 ft. 2 ins. 6 lines. Proportional measurements to total length (taken as 100):—Length of head, $\frac{11}{100}$; width at base of ear, $\frac{9}{100}$; from tip of snout to front of orbit, $\frac{5}{100}$; height of rostral, $\frac{1\frac{1}{2}}{100}$; length of internasal, $\frac{2\frac{1}{2}}{100}$; width, $\frac{2\frac{1}{2}}{100}$; length of frontal plate, $\frac{3}{100}$; width, $\frac{2}{100}$; length of interparietal, $\frac{2}{100}$; from tip of snout to anterior leg, $\frac{22}{100}$; to front of posterior leg, $\frac{54}{100}$; length of tail, $\frac{42}{100}$; width of tail at base, $\frac{9}{100}$; at middle, $\frac{3\frac{1}{2}}{100}$; longest hind toe, $\frac{6}{100}$; longest toe on anterior foot, $\frac{4}{100}$; length of anterior leg to origin of toes, $\frac{12}{100}$; length of hind leg to origin of toes, $\frac{12}{100}$; width of middle of body, $\frac{14}{100}$; depth of ditto, $\frac{10}{100}$. Four scales in length of 6 lines in middle of belly; 4 spinose ridges in same space on back, with 4 scales in same space lengthwise; 3 ridges in same space on tail, and little over 2 spines lengthwise.

REFERENCE.—Stokes' Discoveries in Australia v. 1, p. 499, t. 2.

The Lizards of the genus *Egernia* resemble *Cyclodus* and *Trachydosaurus* (illustrated in former plates) in many respects, but differ in the comparatively long slender toes, the orbit not separated by a row of plates from the labial plates, and in the strongly keeled and spined scales. The tail being conical with a circular section throughout, separates *Egernia* from *Silubosaurus*, which, except for the depressed tail of the latter, it otherwise much resembles.

This rare Lizard was formerly not uncommon at Merri Creek and similar rocky places near Melbourne, and at Sunbury.

The indigo-blue colour of the tongue is so striking as to suggest the popular name of Blue-Tongue for both the banded and the blotched species of *Cyclodus* (*C. gigas* and *C. nigroluteus*), and this *Egernia;* but the latter, which has the tongue of the same colour, but paler, is easily distinguished by its long slender toes and ridged and strongly spined scales.

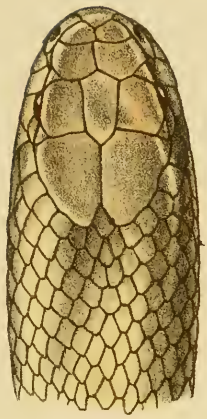
The specimen figured is from Brighton.

Not figured of the colours of life before.

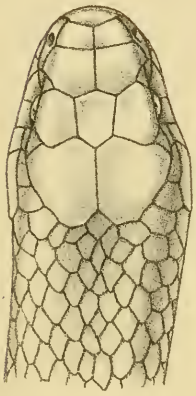
Explanation of Figures.

Plate 141.—Fig. 1, side view of average specimen, two-thirds the natural size. Fig. 1*a*, top of head, natural size, to show form and ridging of plates and scales. Fig. 1*b*, side view of head, natural size. Fig. 1*c*, front view of snout, magnified two diameters, to show rostral plate, nasal plates and nostrils. Fig. 1*d*, underside of head and throat, two-thirds the natural size. Fig. 1*e*, eye, with surrounding scales, magnified two diameters. Fig. 1*f*, nasal plate and nostril, magnified two diameters. Fig. 1*g*, teeth of lower jaw, magnified three diameters. Fig. 1*h*, scales of tail, magnified two diameters. Fig. 1*i*, scales of back, magnified two diameters, Fig. 1*k*, scales of belly, magnified two diameters. Fig. 1*l*, anterior foot, viewed from below, natural size. Fig. 1*m*, hind foot, viewed from below, natural size.

Frederick McCoy.



1b



2

1c

1a

1

PLATE 142.

PSEUDECHYS AUSTRALIS (GRAY).

THE BROWN PSEUDECHYS.

[Genus PSEUDECHYS (WAGLER). (Sub-kingdom Vertebrata. Class Reptilia. Order Ophidia. Family Elapsidæ.)

Gen. Char.—Body and tail moderately elongate, gradually tapering. Head sub-quadrate, flattened above and at the sides, obtusely rounded in front, little wider than the neck behind; no loreal plate; one anterior ocular plate forms the front margin of the orbit, and two posterior oculars its hind edge; two nasal plates, with the nostril between them. Scales of the back flat, smooth, in about 17 rows; anal plate double. a variable number of the anterior sub-caudal plates in one row, behind which they form two rows. Confined to Australia.]

DESCRIPTION.—Scales of back in 25 rows across neck, close behind occipital plates, 17 rows across middle of back, and 13 rows across base of tail; vertex plate elongate, hexagonal, nearly twice as long as wide, wider in front than behind, length more than one-third greater than the space from its anterior angle to posterior edge of rostral plate. Abdominal scales, 210; anal (and preceding) plate double; sub-caudal plates 11 single (1st, 2nd, and 10th double in specimen described), 61 double. *Colour:* Above uniform brown, under side paler, with the edges slightly darker. Total length of body and tail, 6 ft.; length of tail, 1 ft.; length of head from snout to end of occipital plates, 1 in. 2 lines; from tip of snout to end of gape, 1 in. 2 lines; vertex plate, $4\frac{1}{2}$ lines long, hexagonal, $2\frac{2}{3}$ lines wide in front, long sides 3 lines, across posterior lateral angles 2 lines; width of two occipital plates together, 9 lines; length of occipital plate, 6 lines; posterior frontal, $3\frac{1}{2}$ lines; anterior frontal, $2\frac{1}{3}$ lines; fronto-nasal, $1\frac{1}{2}$ lines; width of rostral, 4 lines; height of rostral, $3\frac{1}{2}$ lines.

REFERENCE.—*Naja Australis*, Gray, Zool. Misc., p. 55.

The head seems broader than in the Black Snake (*P. porphyriacus*) figured on our first plate, and more rounded at the sides towards the front, the anterior and posterior frontals being shorter; the vertex plate is longer in proportion to the length of the suture from its anterior angle to the posterior angle of the rostral plate, but I observe that undoubted specimens of the Black Snake vary considerably in the shape and proportion of the vertex plate, some being slightly shorter in proportion to the width, but they all seem to have, as in our figure, Plate 1, fig. 2*c*, the lateral sides nearly parallel, while in *P. Australis* the vertex plate narrows perceptibly posteriorly, and is always greatly longer in proportion to the width. As in the Black Snake (*P. porphyriacus*) my figure

of the top of the head in Plate 1, fig. 2*c*, shows the form of the plates in the young (one-third larger than nature), and as the adult of the same size as our present figured *P. Australis* always has the vertex plate proportionally broader and shorter than in the young, I give in the present Plate 142, fig. 2, a representation of the top of the head, natural size, of a Black Snake of the same size as fig. 1*b* of the present species, so that the relative differences of the shape, length, and width of the vertex plate, and the proportionate distance from it to the rostral plate may be seen in each. The vertex plate is scarcely one-fifth longer than wide, or nearly as broad as long in the adult *P. porphyriacus*, the length being slightly less than from its anterior angle to posterior angle of rostral plate, and nearly twice as long as wide in *P. Australis*, in which the plates in front are shortened, giving the blunter or wider outline to the anterior part of the head in it.

The belly has the colour and lustre of polished copper in some specimens.

This species is only found in the warm northern parts of the colony near the Murray, being very abundant on the scorching plains, and very virulent and deadly in the bite, both for man and beast. The figured specimen is from Kewell.

Not figured of colours of life before.

Explanation of Figures.

Plate 142.—Fig. 1, ordinary specimen, one-half natural size, showing the single row of anterior subcaudal plates (with an abnormal doubling of the two anterior ones) and the two rows of posterior subcaudals (with an abnormal single one following the first pair). Fig. 1*a*, side view of head, natural size. Fig. 1*b*, top view of head, natural size, showing the elongate form of the vertex plate. Fig. 1*c*, front view of same, to show rostral plate, natural size. Fig. 2, top view of head of Black Snake (*P. porphyriacus*) natural size, to show the broader and shorter vertex plate, and the greater proportional distance from its anterior angle to posterior angle of rostral plate.

Frederick McCoy.

1a
1g
1
1c
1b
1d
1e
1f
2a
2
2b
1i
1h

PLATE 143.

MONACANTHUS PERONII (HOLLARD).

PERON'S LEATHERJACKET.

[Genus MONACANTHUS (CUV.) + ALUTERIUS (CUV.). (Sub-kingdom Vertebrata. Class Pisces. Sub-class Telostei. Order Plectognathi. Family Sclerodermi.)

Gen. Char.—Body compressed, elevated in the middle; scales small, rhombic, distinct on inner surface of skin, obscured by minute spines roughening the outer surface; sides of tail with 4 or 6 hooked spines in 2 or 3 rows, smaller or absent in females. Lateral line absent or indistinct. Teeth, six broad, flat, sharp-edged incisors in outer row of each jaw, and four, forming an inner row, in upper jaw, alternating, one between the 1st and 2nd, and the other between the 2nd and 3rd on each side of the outer row. Fins: 1st dorsal composed of one large, thick, rough, bony spine, which may be fixed in erect position or lowered into a pit on back, over the eye; membrane very small, triangular at base, with or without a second, small, rudimentary spine: soft dorsal and anal long and low, with simple unbranched rays; pectoral small, rounded; caudal rounded; ventrals replaced by a small spine, sometimes rudimentary or absent. Branchial slit in front of base of pectoral. No barbel to chin. Tropical and sub-tropical seas.]

D. 33 to 34; A. 33; P. 12; C. 12.

DESCRIPTION.—Body sub-ovate, compressed; profile of forehead slightly concave between eye and snout, rising with gentle convexity to origin of second dorsal at an angle of about 30°. Lower lip slightly protruding beyond the upper. Greatest depth of body about twice and a half in total length, including caudal fin. Eye large, a little below frontal edge; branchial slit oblique, slightly longer than diameter of eye, lower end in front of upper base of pectoral. First dorsal spine with its anterior base over middle of eye, thick, strong, quadrate in section, slightly arched forwards, about half the length of from anterior edge of orbit to mouth; the four edges set with about 15 conical spines arched downwards and outwards, those on two anterior ridges nearly three times as large as those on posterior ridges, which are more equal, numerous, and closer; a row of smaller spines on base of front and lateral faces. One very small ray in membrane behind the great spine; pelvic spine at end of long bony ridge of ventral edge very small, with a few rounded granules on middle, and 4 or 6 triangular spines on posterior end directed backwards; abdominal edge from pelvic spine to anus convex or concave according to temporary causes, ventral edge rising abruptly from end of spine to front of anal fin. *Fins:* Pectoral semi-oval, of 12 rays; dorsal high, moderately convex, of 34 rays, increasing in height to ninth ray, gradually decreasing thence to posterior end; anal of 33 rays, moderately deep, rounded, rays lengthening gradually to sixth or seventh, gradually diminishing to posterior end; caudal fin narrow, rounded, of 12 thick, branched, spinulose rays. *Skin:* With oval scales, marked with radiating, close, branched ridges, each scale having from its centre a long, thick, cylindrical spine obliquely dilated and subtruncated at an obtuse angle in front, leaving an acute point directed backwards at the tip, in most portions of the body; but, in a few places, terminating in an arched, acute, spinous tip with the dilatation lower down on the stem. In specimen described no "tooth-brush" group of bristle-like spines on sides

of tail, nor conical thorns; in other specimens, probably males, the "tooth-brush" spines, $6\frac{1}{2}$ lines long, are developed on each side of tail, without thorns. *Colour:* Whole body yellowish-brown, fading irregularly into paler on throat, tail, and middle of body; irregularly spotted with darker brown in most specimens; dorsal and anal fins with nearly colourless membranes, and yellowish-brown rays; caudal with pale dusky membrane and yellowish-brown rays, darker than those of the dorsal or anal fins, crossed by two narrow brown bands, one near the middle and one near the posterior edge; under a lens the scales are minutely dotted with black. *Measurements:* Total length from snout to end of caudal fin, 10 inches. Proportional measurements to total length, as 100:—Snout to anterior end of orbit, $\frac{24}{100}$; greatest depth of body, $\frac{42}{100}$; greatest thickness behind head, $\frac{13}{100}$; diameter of eye, $\frac{5}{100}$; height of 1st dorsal spine, $\frac{10}{100}$; distance of base from edge of upper teeth, $\frac{27}{100}$; length of branchial slit, $\frac{5\frac{1}{2}}{100}$; length of pectoral, $\frac{12}{100}$; length of 2nd dorsal, $\frac{31}{100}$; greatest height of ditto, $\frac{12}{100}$; from snout to anterior ray of ditto, $\frac{48}{100}$; from snout to anterior ray of anal, $\frac{53}{100}$; length of anal, $\frac{28}{100}$; greatest height of ditto, $\frac{9}{100}$; length of caudal, $\frac{15}{100}$. Number of spines in space of 3 lines, about middle of body, 6.

Reference —Ann. des Sciences Nat., 4th série., v. 2, p. 356, t. 13, f. 8.

The small skin-spines of this species only present the appearance figured by M. Hollard, when looked down upon with a magnifier from above, but when a bit of skin is cut off and properly mounted to allow of a side view, the spines are all as in our plate, widening near the point, which is obliquely truncated at an obtuse angle, which angle, in some points of view, looks exactly like a swelling below the apex, as in M. Hollard's figures and descriptions. When fresh the spines are covered with a thick, finely black-dotted skin, which soon shrinks from the apex, leaving the sharp point exposed; and very often it also shrinks from the stem, leaving a portion at the angle where the oblique truncation of the apex occurs, thus increasing the appearance of a bulb below the point. In the male, with the "tooth-brush" group of setaceous spines on the sides of the tail, the form is rather more slender, the depth being less than one-third of the total length, including caudal fin ($\frac{33}{100}$); and the head in front of eye is perceptibly longer and forming a smaller angle with the midline.

In our male specimen the dorsal fin has 32 rays, and the anal 31; another female has 34 dorsal and 32 anal rays; the figured specimen has 34 dorsal and 33 anal. In our specimens the end of the pelvic spine may be drawn out so that the depth of body is one-half the total length, excluding caudal fin; and it may

be pressed in so as to give the most slender proportion indicated above. There are two specimens in the Museum collection in which the great dorsal spine is doubled, one on each side of the midline.

Our male specimen is from Warrnambool, presented by C. H. Lay, Esq., ($12\frac{1}{2}$ ins. long), with distinct round brown spotting on back and under dorsal fin, spots becoming larger and less distinct on rest of body. Another in the collection is from over the Lightning Rock, at Port Phillip Heads.

Explanation of Figure.

Plate 143.—Fig. 1, average female specimen, $\frac{2}{3}$ natural size. Fig. 1*a*, side view of teeth, twice the natural size. Fig. 1*b*, first dorsal spine, magnified twice the natural size (tip imperfect), showing the anterior and posterior thorns and second ray in membrane at base. Fig. 1*c*, section of first dorsal spine, three times the natural size. Fig. 1*d*, skin-spines from near middle of side, showing radiated base, slender stem and dilated, obliquely truncated upper end, magnified about twenty times natural size. Fig. 1*e*, shorter and thicker spine, magnified about twenty times natural size. Fig. 1*f*, ventral spine, three times the natural size. Fig 1*g*, skin-spines from under pectoral, covered with soft skin, magnified twenty diameters. Fig. 1*h*, very slender spines, with diminished dilatation from near tail, magnified twenty diameters. Fig. 1*i*, some of the skin-spines with the external soft skin shrunk from all but a small space near dilated tip, magnified twenty diameters. Fig. 2, spine from another specimen, with the apex perfect, showing the forward arch and second ray and membrane at base, natural size. Fig. 2*a*, section of ditto, three times natural size. Fig. 2*b*, section of tail of same specimen to show the "tooth-brush" lengthened spines on sides.

Frederick McCoy.

ZOOLOGY OF VICTORIA
(Fishes)

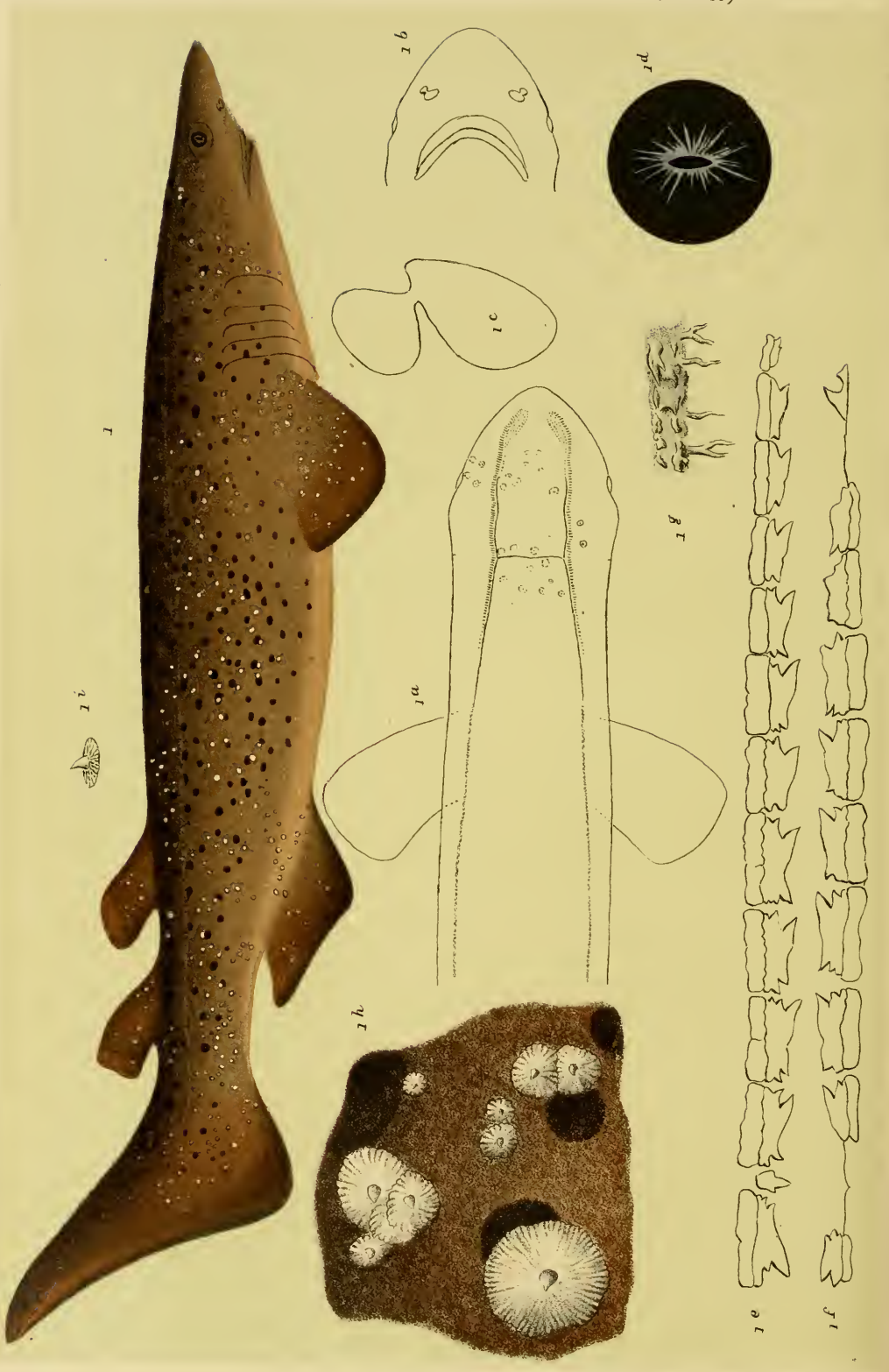


PLATE 144.

ECHINORHINUS SPINOSUS (LIN. SP.).

THE SPINOUS SHARK.

[Genus ECHINORHINUS (BLAINVILLE). (Sub-kingdom Vertebrata. Class Pisces. Order Plagiostomata. Section Selachoidei. Family Spinacidæ.)

Gen. Char.—Dorsal fins two, small, nearly equal, without anterior spine, the anterior edge of anterior dorsal slightly behind the anterior margin of ventrals. No anal fin. Skin with radiated, bony tubercles with conical spine in the middle, very irregular in size and disposition. Mouth crescentic, with a strong fold of skin round the angle. Teeth approximately equal in both jaws, having nearly horizontal cutting edges, from the principal cusp being directed backwards and very little upwards, with large denticles on the anterior and posterior bases of all except the one or two posterior teeth. Nostrils reniform, nearly half-way between eye and tip of snout. Spiracles very small, behind the eye and behind the vertical of the corner of the mouth. No nictitating membrane. Gill openings of moderate size.]

DESCRIPTION.—Body thick, fusiform. Head flattened above, semi-elliptically rounded in front, the width at posterior edge of orbits about one-fourth greater than the length of the snout to the line connecting them. Nostrils reniform, with long, slender median lobe extending backwards from anterior margin; the anterior edge a little nearer to tip of snout than to posterior edge of orbit. Dorsal fins higher than long, oblong, rounded, subtruncate at upper posterior edge; first dorsal commencing a little behind vertical of anterior edge of ventrals; second dorsal rather less than the length of the base of the first dorsal behind it. Tail strong, short, raised; caudal fin broad, with a slightly concave posterior edge, and a nearly rectangular, posterior, lower, rounded angle. Ventrals rhombic. Pectorals oblong. Gill openings moderately large, about half of the posterior one above and half below the anterior edge of pectoral; the anterior one with three-fourths of its length above same level. Lateral line at end of tail running into the caudal fin to the edge, coinciding with junction of upper lobe and fin for a short distance, and thence extending forwards in a nearly straight line a little above one-fourth of the depth from mid-line of back as far as the vertical of the anterior edge of the third gill opening. In all this length it is roughened with rows of minute, slender, hooked spines; beyond this the line extends forward and a little upwards as two rows on each side of smooth mucous pores, having a transverse similar band connecting them a little behind the vertical of the hind angle of the mouth, the rows of pores extending thence with irregular flexures, widening and converging near tip of snout, but separated in front by a narrow space. *Teeth:* Ten above and ten below on each side; no tooth in the centre above; one small conical one with a small cusp on each side of base in centre below. *Skin:* Very thin, with minute, close granules and numerous, radiated bony spines, varying from 1 inch to $\frac{1}{12}$ inch in diameter of base, very irregular in size, shape and distribution, over the whole body and fins, except anterior portion of snout; radiating ridges of spines branching, and with shorter simple ones between as they diverge; central spine sharp, smooth, vertical, or with a slight downward or backward curve. *Colour:* Purplish-brown, paler below; back and sides with numerous, rounded, darker spots; whitish under chin and edge of lip; edges of pectoral, ventral and caudal fins darker brown; tubercles white. Iris greenish-black, with silvery and bronze-green and blue radiating lines from edge of pupil.

MEASUREMENTS.

	Ft.	ins.	lines.
Length from tip of snout to distal end of caudal fin	7	2	3
„ „ „ anterior edge of orbit	0	7	0
„ „ „ anterior edge of upper jaw ...	0	5	6
„ „ „ anterior edge of pectoral... ...	1	11	0
„ „ „ origin of 1st dorsal	4	3	0
„ „ „ origin of 2nd dorsal	4	11	6
„ „ „ origin of ventral	4	2	0
„ superior to inferior angles of caudal fin	1	8	0
„ anterior edge of lower lobe of caudal fin to tip of tail	1	11	0
„ „ to lower lobe of caudal	0	9	0
Height of 1st dorsal	0	7	0
Length of base of same	0	5	0
Height of 2nd dorsal	0	5	9
Length of base	0	4	0
„ „ of ventral	0	10	0
„ lower edge of same	0	7	0
„ posterior edge of same	0	8	6
„ upper edge of same	0	3	6
„ anterior edge of pectoral	0	9	6
Greatest width	0	7	0
Girth in front of pectorals	2	10	0
Diameter of orbit	0	2	0
Height of hind gill opening	0	5	6
„ anterior gill opening	0	2	6
Length from tip of snout to anterior edge of nostril	0	4	6
Width of head between upper edges of orbits	0	9	0
Length of base of anterior tooth of upper jaw	0	0	6
„ „ „ „ lower jaw	0	0	5½
Width of mouth	0	7	0

REFERENCES.— = *Squalus spinosus*, Gm. Lin., i., p. 1500; = *Echinorhinus spinosus*, Blain. F. F., p. 66; Yarrell Brit. F., 2nd ed., p. 532; = *Echinorhinus obesus*, Smith, Il. Zool., S. A. Pisc., t. 1; Couch F. Brit. I., v. 1, t. 12; Bonaparte, F. Ital. Pisci.

The careful figure here given is intermediate between Yarrell's first slender figure and Couch's short thick one, which latter more nearly agrees with Smith's South African drawing. Sharks, I know, vary considerably in this respect in different individuals of one species, and neither of the British authors seem to have seen the fish, and they have both published the drawings of amateurs sent to them—so that the present figure may very probably represent the average proportions. The short thick figure given by Couch from a drawing sent to him by Mr. Cocks, of Falmouth, is obviously not very accurate, as the five gill openings are made equal in length and entirely below the base of the pectoral; and the caudal fin being widest in the middle is improbable. The more slender figure above quoted as given by Yarrell, from a drawing sent to him by Mr. Hey, of the Filey Bay specimen, gives the relative sizes and positions of the gill openings more correctly. Several other figures are also about

as slender as ours, and the Prince C. Bonaparte's figure, in his *Fauna Italica*, is almost identical in shape and coloring with ours, but has the pectoral and ventral fins too large, and the gill openings too nearly equal. Dr. Smith's figure of the Cape of Good Hope specimen is much thicker, but does not seem very good, as the gill openings are entirely below the level of the base of the pectoral, although it shows the shape of the top of the head pretty well. A smaller specimen I have in the Museum from the Mediterranean is 5 ft. long, and 1 ft. 11 in. in girth in front of the pectorals, being, therefore, like ours in shape, and it agrees in all other particulars. The number of teeth above and below figured by the Prince of Canino is in accord with my counting of the Australian specimen rather than with Dr. Günther's, which latter is nearly double those in my European example also, and is probably a mistake of some sort.

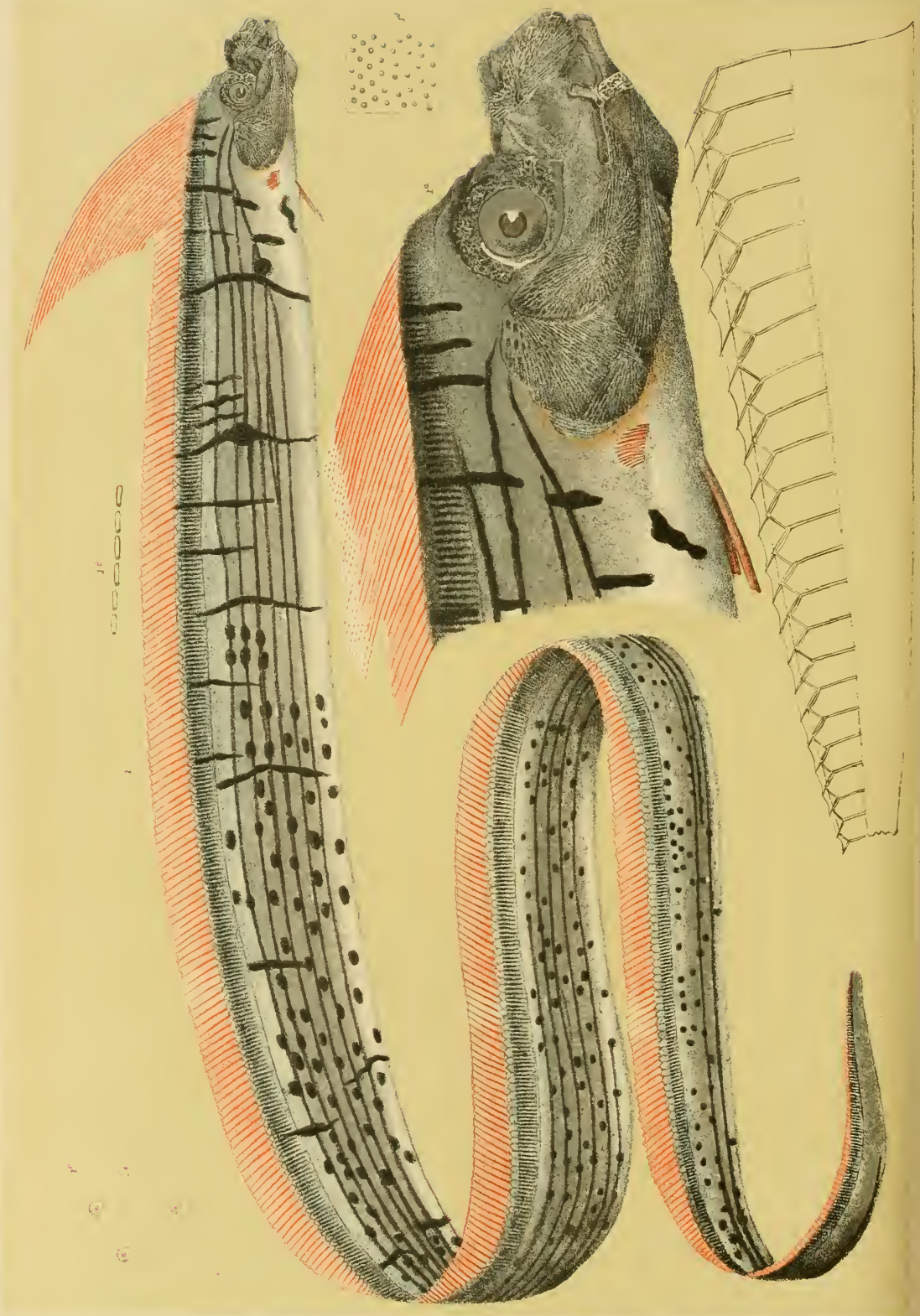
All observers agree in this being a sluggish ground-shark, feeding on crabs and other creatures living on the bottom.

This is the first example recorded in Australian waters, and is one of the many rarities in the Museum I owe to the vigilance of Mr. M. Dusting, of Portland, where it was caught, on the 24th of November, 1886, on a shark line or rope, with baited hooks attached, let down to the rocky bottom by weights.

Explanation of Figures.

Plate 144.—Fig. 1, side view of specimen about one-tenth the natural size. Fig. 1*a*, top of head, to show shape of top of head and arrangement of mucous pores in front of the anterior terminations of the lateral line, one-tenth natural size. Fig. 1*b*, underside of head to show form and position of mouth and nostrils, one-tenth natural size. Fig. 1*c*, one of the nostrils, natural size, to show form of lobes. Fig. 1*d*, iris, natural size. Fig. 1*e*, central tooth and lateral series with one of opposite side, natural size. Fig. 1*f*, space without median tooth and lateral series, natural size (the penultimate one absent). Fig. 1*g*, portion of lateral line, to show spinulose appendages, natural size. Fig. 1*h*, portion of skin, natural size, to show the irregular superficial spines. Fig. 1*i*, small spine, viewed in profile, to show the relative shape of thorn and base, natural size.

Frederick McCoy.



A. Bartholomew del. et lith.

Prof. McCoy direx.

Steam litho. Govt. Printing Office

PLATE 145.

REGALECUS BANKSI (CUV. SP.).

BANKS' OAR-FISH.

[Genus REGALECUS (BRÜNN.). (Sub-kingdom Vertebrata. Class Pisces. Sub-class Teleostei. Order Acanthopterygia. Family Trachypteridæ.)

Gen. Char.—Head small; mouth small, protractile, usually without teeth; body very long, gradually tapering to the tail, greatly compressed; gill openings wide, branchiostegal rays, 6; gills, 4; pseudobranchia. Fins: of simple rays, 1 dorsal, extending from nape to end of tail, the rays of anterior portion much higher and closer than the rest; no anal; no caudal; pectorals small, rounded; ventrals thoracic, each formed of one long, slender shaft, dilated at distal end. No air bladder.]

DESCRIPTION.—Length of head about 22 times in total length, or slightly less; greatest depth about 23 times in total length. Dorsal fin of 17 long, closely placed anterior rays, and 406 shorter ones, more widely separated, gradually diminishing to end of tail, extending slightly beyond the membrane, and each ray having a minute conical spine at its base. Pectoral rounded, of 12 rays. Ventrals each of 1 cylindrical shaft (imperfect, broken off in specimen 2 or 3 inches beyond base); 4 longitudinal, broad, flattened ridges, separated by narrow sulci, extend from head to tail over the lateral line, which cuts them off obliquely in front, by descending rapidly from nape to about one-fourth the depth of the body from ventral edge. Lateral line of narrow, elongate, oblong, tubular scales; it ends at about $\frac{1}{18}$ of the total length from the end of the tail (or 9 inches, at about $\frac{1}{3}$ of the depth, from the ventral edge). Preoperculum, operculum, interoperculum, suboperculum, and other bones of head irregularly pitted and radiatingly marked with short, irregular grooves. Eye large, flat, a little in front of and above middle of head. No teeth. Surface of skin studded with small, conical, slightly radiated, bony granules. *Colour:* Whole head and body brilliant metallic-silvery, slightly tinged with pale lavender-grey on back and anterior part of head; pectoral white; dorsal with bright red rays, the membrane rose-red, paler at base than at margin; about 19 vertical black streaks, half an inch wide, of variable length, cross the anterior half of the body, and 5 or 6 longitudinal rows of longitudinally oval, blackish spots on posterior three-fifths; no spots near tail. Iris white. Inside of mouth black. *Measurements:* Total length, 13 ft. 7 in.; length of head, 7 in. 6 lines; depth at vertical of eye, 5 in. 3 lines; greatest depth of body, 7 in. 3 lines; thickness of body, $2\frac{1}{2}$ in.; diameter of eye, 1 in. 6 lines; length of long anterior dorsal fin-rays (imperfect), 1 ft. 4 in. 6 lines; length of shorter ones on greater part of body, 2 in.; length of pectoral fin, 1 in. Six scales of lateral line in 1 in. Six granules of skin in space of $\frac{1}{2}$ in.

REFERENCES.— = (?) *Regalecus Glesne* (Ascanius) Icones Rer. Nat., t. 11; ? = *Gymnetrus Grilli* (Lindroth) Kongl. Vetensk. Acad. Nya Handl., t. 8; = *Gymnetrus Banksi*, Cuv. and Val., Hist. Nat. des Poiss., v. 10, p. 365; Hancock and Embleton, Annals of Nat. Hist., July, 1849, t. 1 and 2; = *Gymnetrus Hawkinsi*, Bloch, v. 12, t. 425.

So few examples of this fish have been observed, and those described were so imperfect, that I am very glad to be able to give a figure and description of an Australian one, caught in the waters

between the Tasmanian and Victorian coasts, in May, 1878. The tail is more nearly perfect than in any other described one, although, unfortunately, slightly mutilated now in stuffing, but to so small an extent that I give a figure of this part, natural size, to show the defect exactly. The extreme brittleness of the fin rays, as in all the family *Trachypteridæ*, has only left 2 or 3 inches of the basal portion of the shaft of each ventral fin, the dilated paddle-shaped distal end being absent, and leaving the length of the rays of the anterior dorsal crest uncertain. The great number of rays in the dorsal, which I give, is accounted for by the greater perfection of the tail end of the specimen in our Museum. Hancock's figured specimen is generally accepted as perfect, and he counts 268 rays in the dorsal behind the crest ; but as he states the fin rays to be 1 in. high at the end where, he says, thebody is 3 inches deep, I think this is an indication that the body had lost formerly about 2 ft. of the tail end, which had probably healed up in the very unnatural form he depicts, and as also represented in Mr. Couch's figure of the same specimen. Our specimen, a foot longer than his, tapers to a perfectly regular end, only half an inch in depth, and with the last rays of the fin only about $\frac{1}{13}$ of an inch high ; the 4 inches deep of fin and body he gives would be found at about 2 ft. from the end, and the missing portion would therefore have carried about 120 more rays than he gives, making a near approach to my number, which is clear. Lindroth counts 406 rays in the dorsal of his *Gymnetrus Grillii*. Although I think it quite likely that Dr. Gray is correct in considering *G. Glesne* and *G. Grilli* as different, imperfect, descriptions of imperfect specimens of the same species named *G. Banksi* by Cuvier and Valenciennes, and figured and described in detail by Hancock and Embleton, and that, therefore, the proper name to use would be *R. Glesne*, I prefer to use the name referring to Hancock's fish, concerning which there can be the least doubt of any of the figures and descriptions given before, particularly as Ascanius' figure of *R. Glesne* is proportionately shorter, and represents the fin as going round the caudal end of the body.

The silvering of the surface comes off at every touch, like the dust on a moth's wing.

The smaller proportional depth of the body compared to the total length in the fresh specimen I have examined, than in that caught in Filey Bay, and named the type of *G. Banksi*, may perhaps be a sexual peculiarity of the male. The depth published of the Filey Bay specimen, 13 ft. long, is 1 ft., and probably includes the fin ; in our specimen of the same length the fin is 2 in., and the body $7\frac{1}{4}$ in., or $2\frac{3}{4}$ in. less. The example caught in a shallow pool, in 1800, at the outer Fern Islands, was only 1 ft. deep, with a length of 18 ft. ; the one measured in 1845, at Alnmouth, was 16 ft. long, and 11 in. deep. The greatest length recorded is 24 ft., found on the Yorkshire coast, near Redcar, in 1850. The spines on the crest are cylindrical, hollow, and slightly rough. The granules on the body are like little seed pearls, largest on the ventral line.

I have little doubt that this fish is the "Sea Serpent" of the popular accounts in the newspapers of observations made far out at sea by captains of ships, perfectly trustworthy, but not sufficiently instructed in zoology to give good descriptions. The *Regalecus*, like the *Trachypterus*, is so excessively fragile that it is obvious it could only live in the depths of the ocean, far from land, where the water is still and free from the turbulence of the shallow soundings near the coasts, in which the majority of ordinary fishes flourish ; and the few specimens which have been caught were dead or dying, and much damaged in the shallow waters. As one recorded measured 24 ft. with a depth of about 1, we have here no inconsiderable approach to the dimensions reported of the "Sea Serpent." Making some reasonable allowance for the portion not exposed above the surface, and bearing in mind that many fishes continue to grow as long as they live, we may reasonably expect far longer specimens to exist in their proper habitats far from land, and occasionally showing on the surface there with just the appearance usually described, namely, a small head, with a "tall crest" and a fin along the back. Now there are Sea Snakes, well known, of small size, but no snakes or serpents have a crest and fin along the back; while the description is fairly matched by our fish. I think captains of ships are too familiar with Seals, Conger Eels, or long stretches of ocean seaweeds to mistake any of them, as different

authors have suggested, for a "Sea Serpent," but the *Regalecus*, from its great rarity, would be quite unfamiliar, and its form would suggest a serpent to an untrained observer. The mode of progression described and roughly sketched by mariners, vertical undulations seen on the surface of the sea in the Sea Serpent, although so unusual in fishes, has actually been observed in this fish. The specimen caught by three Cullercoats fishermen, 6 miles from shore, in 20 to 30 fathoms water, was first seen lying on its side on the top of the water, obviously dying. As they approached it righted itself and came towards them with a gentle, lateral, undulating motion, showing its crest and part of the head above water. On being struck it made off with a vigorous *vertical* undulating motion, disappearing rapidly below the surface. It was brought to Newcastle next morning, and is the one described by Mr. Hancock and Dr. Embleton in the Annals of Natural History for July, 1849. Being destitute of teeth the creature is, of course, perfectly harmless, and probably feeds on minute crustacea and medusæ.

Explanation of Figures.

Plate 145.—Fig. 1, side view of specimen, $\frac{1}{8}$ the natural size. Fig. 1*a*, head, $\frac{1}{3}$ natural size. Fig. 1*b*, posterior termination of specimen, natural size, showing the dorsal fin reduced to less than a line in height. Fig. 1*c*, granules of skin, magnified, to show crenulated circular base and central point. Fig. 1*d*, granules of skin, natural size. Fig. 1*e*, tubular scales of lateral line, natural size.

Frederick McCoy.

P. H. Mac Gillivray del. Kasper lith. Govt. Printer, Melbourne

PLATE 146, FIG. 1.

CATENICELLA GEMELLA (McG.).

[Genus CATENICELLA (BLAINVILLE). (Sub-kingdom Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Family Catenicellidæ.)

Gen. Char.—Branches originating from the summits of each of a geminate pair, or rarely from the sides of ordinary zoœcia. Zoœcia in single series, but at a bifurcation geminate, or each internode consisting of a geminate pair; mouth with simple margins, straight or hollowed and entire below, or with a small, rounded notch.]

DESCRIPTION.—Each internode consisting of a geminate pair of zoœcia, each pair in the main stem giving origin to two double zoœcia, the one pair continuing the stem directly upwards, the other originating a lateral branch, these branches starting alternately right and left; the lateral branches mostly undivided, but occasionally giving off secondary branches; in the lateral branches, the geminate pairs giving off the next pair alternately from the right and left zoœcium; mouth large, lofty, straight below. Beneath the mouth a series of 5–7 fenestræ around an area continuous with that of the mouth, depressed at the margin and slightly bulging centrally; the mouth and fenestrate area surrounded by a thick margin; lateral processes large; at each upper angle a small, acuminate, chitinous process (possibly the mandible of a small avicularium); a minute, marginal, avicularium at the middle of each lateral process on the extremity of a tube-like mark; a small avicularium on a slight elevation between the zoœcia. Posterior surface umbonate and finely sulcate.

REFERENCE.—P. H. MacGillivray, Trans. Roy. Soc. Vict., July 1886.

Port Phillip Heads, Mr. J. B. Wilson.

I have only examined two small specimens of this species, which is characterized by the *constant* gemination and peculiar arrangement of the zoœcia. The structure of the zoœcia is, however, precisely that of the geminate pairs in *C. alata*, including the anterior avicularia and the chitinous points on the upper angles; and I at first referred it to that species, an opinion which Mr. Waters has also expressed in a letter to me. I think it ought, in consideration of its peculiar colonial habit, to be ranked as a species, although it is quite possible that the examination of other specimens may show that it is merely a variety of *C. alata*.

EXPLANATION OF FIGURE.

PLATE 146.—Fig. 1, portion of branch magnified, anterior view.

PLATE 146, FIG. 2.

CATENICELLA URNULA (McG.).

DESCRIPTION.—Zoœcia vase-shaped; mouth slightly hollowed below; anterior surface with 7 large, shallow fenestræ; lateral processes large, erect, sharply pointed, frequently a small avicularium on the front of one or both, and a shallow hollow on the superior surface. Posterior surface with a narrow, vertical, thickened band, from which two processes extend on each side to the margin of the zoœcium, leaving three shallow depressions. Oœcia galeate, on the summit of zoœcia.

REFERENCE.—P. H. MacGillivray, Trans. Roy. Soc. Vict., March 1886.

Port Phillip Heads, Mr. J. B. Wilson.

This species is of a dark reddish-brown colour, and attains a large size, a tuft received from Mr. Wilson being 6 inches in height. It is allied to *C. plagiostoma* and *C. intermedia*, but is readily distinguished by its straight mouth, the shallowness of the fenestræ, the shape and structure of the avicularian processes, and the markings on the back of the zoœcia. The oœcia are large and terminal. The ovicelligerous zoœcium has a deep, rounded sinus in the lower lip of the mouth, and a very large operculum; the upper margin of the mouth is bordered by a thick rim, above which, on each side of the oœcium, is a broad depressed area. The back of the ovicelligerous cell is smooth, separated by a raised line from the oœcium, which has usually a transverse, elliptical depression and two somewhat quadrate, superior spaces, separated by raised bands. I have only examined dried specimens, and it is possible that the depressed areas may, in the living state, be level or even elevated.

EXPLANATION OF FIGURES.

PLATE 146.—Fig. 2, front view of small portion of branch, magnified. Fig. 2*a*, back view of same.

PLATE 146, FIG. 3.

CATENICELLA GRACILENTA (McG.).

DESCRIPTION.—Zoœcia much elongated, very narrow; mouth arched above and slightly hollowed below, or sub-circular; anterior surface papillose, posterior smooth;

a narrow, entirely lateral vitta extending the whole length of the zoœcium; lateral processes small, usually with a sharp angle above projecting outwards and forwards; a minute avicularium opening outwards on the outer edge. Oœcium cemented to the front of the zoœcium above, with a quadrate smooth area.

Reference.—P. H. MacGillivray, Trans. Roy. Soc. Vict., Nov. 1884.

Port Phillip Heads, Mr. J. B. Wilson.

In this small species the zoœcia are exceedingly slender. The oœcium, which is cemented to the cell above, as in *C. elegans*, *Buskii*, *fusca*, and some others, has on the front a smooth, quadrate area, totally different from the markings of any other species.

Explanation of Figures.

Plate 146.—Fig. 3, anterior surface of portion of a branch, magnified. Fig. 3*a*, posterior view of same.

Plate 146, Fig. 4.

CATENICELLA VENUSTA (McG.).

Description.—Zoarium small; branches very slender, crystalline. Zoœcia elongated, very narrow, with usually a sharp, barren process on one side and a thick aviculiferous one on the other; mouth sub-circular; a narrow, sub-lateral vitta extending about two-thirds of the length of the zoœcium; surface in front slightly papillose. Oœcia elongated upwards, adnate to the cell above, with a vertical thickened line (indicating the closure of a fissure), margin with a thickened rim, inside which is usually a series of white-bordered puncta.

Reference.—P. H. MacGillivray, Trans. Roy. Soc. Vict., March 1886.

Port Phillip Heads, Mr. J. B. Wilson.

In this lovely species, the zoœcia are remarkably slender. The avicularian processes are directed upwards and forwards; one is usually sharply pointed and without avicularium, while the other is thicker, and is surmounted by a minute avicularium.

Explanation of Figures.

Plate 146.—Fig 4, anterior view of portion of a branch, magnified; an oœcium shows the vertical fissure only partially closed. Fig. 4*a*, two zoœcia and mature oœcium. Fig. 4*b*, posterior view of portion of same branch.

PLATE 146, FIG. 5.

CLAVIPORELLA PULCHRA (McG.).

[Genus CLAVIPORELLA (McG.). (Sub-kingdom Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Family Catenicellidæ.)

Gen. Char.—Branches springing, usually, from the summits of the zoœcia of a geminate pair, but, occasionally, from the sides of single zoœcia. Zoœcia single or geminate; usually a large lateral process on each side above, supporting a large, gaping avicularium, occasionally small, altered or aborted; mouth narrow, arched above, contracted below, and extending downwards as a deep notch, giving the whole a key-hole appearance; usually several blunt, hollow processes above and to the side of the mouth.]

DESCRIPTION.—Zoarium very small; branches originating either from the summits of geminate zoœcia or from the sides of ordinary zoœcia. Zoœcia vase-shaped, with, usually, a wide lateral process on each side, turned slightly forwards and supporting a gaping avicularium; mouth narrow, with the oral sinus very narrow and with a tumid border; two blunt, mamilliform processes on each side of the mouth; a central, vertically-elongated pore in the front of the zoœcium, the rest of the surface papillose, with the papillæ generally larger in the neighbourhood of the central pore; posterior surface smooth.

REFERENCE.—P. H. MacGillivray, Trans. Roy. Soc. Vict., July 1886.

Port Phillip Heads, Mr. J. Bracebridge Wilson.

At once distinguished from the other species by the smaller and narrower zoœcia. It is the only species in which I have seen the branches originate from the sides of zoœcia.

EXPLANATION OF FIGURE.

PLATE 146.—Fig. 5, portion of branch showing the anterior surface, magnified.

PLATE 146, FIG. 6.

CLAVIPORELLA IMPERFORATA (McG.).

DESCRIPTION.—Zoarium small; branches originating from the upper extremity of each of the zoœcia of a geminate pair. Zoœcia broadly vase-shaped; a wide, gaping avicularium (frequently differing in size or wanting) at each upper angle; mouth rather wide, oral sinus small; two mamilliform processes on each side of the mouth; front of zoœcia papillose, usually a few of the papillæ towards the centre larger, and, when worn, forming pore-like marks, but no proper central pore. Posterior surface smooth. Oœcia galeate, tubercular, either surmounting the terminal zoœcium of a branch or one in its continuity; in the former case the upper outline rounded, in the latter a wide, gaping avicularium at each upper angle.

REFERENCE.—P. H. McGillivray, Trans. Roy. Soc. Vict., July 1886.

Port Phillip Heads.

Closely allied to *C. aurita* (Busk sp.), but differing principally in the absence of the central foramen. The genus *Claviporella*, as proposed by me, differs from *Catenicella* in the peculiar key-hole form of the mouth, and from *Calpidium*, in which the shape of the mouth is somewhat similar, in wanting the overarching hood of that genus.

Explanation of Figure.

Plate 146.—Fig. 6, portion of branch, anterior surface, magnified, showing also a terminal oœcium and one in the continuity of a branch.

The specimens and descriptions of the Polyzoa on this Plate are from Mr. MacGillivray.

Frederick McCoy.

Diastopora

P. H. Mac Gillivray del.

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Plate 147, Fig. 1.

DIASTOPORA CRISTATA (McG.).

[Genus DIASTOPORA (Johnston). (Sub-kingdom Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Family Tubuliporidæ.)

Gen. Char.—Zoarium adnate, discoid or flabelliform, or wholly or partly raised and bilaminate. Zoœcia tubular, with an elliptical or sub-circular orifice, crowded and immersed towards the centre, more distinct and partially free towards the margins.]

Description.—Zoarium either encrusting and with portions raised into bilaminate lobes, or wholly bilaminate, the laminæ parted by a thin calcareous septum, the margin of which is produced beyond the zoœcia to form a crest-like ridge. Zoœcia crowded, free for a considerable extent; immersed portions separated by shallow grooves; surface finely and closely punctate, except the free part which is smooth or obscurely ringed; mouth circular or oblique. Oœcium a large inflation of the zoarium.

Reference.—P. H. MacGillivray, Trans. Roy. Soc. Vict., March 1886.

Port Phillip Heads, Mr. J. Bracebridge Wilson.

In some specimens, as that figured of the natural size, the greater part of the zoarium is bilaminate, the lobes being large and only a small part encrusting. In others, as in that from which the magnified figures were drawn, the zoarium is mostly encrusting, frequently surrounding the calcareous tubes of annelids, and in parts rising into small bilaminate lobes. In the encrusting parts a thin, basal, calcareous membrane frequently extends beyond the zoœcia, and a similar membrane separates the layers of the bilaminate lobes. The zoœcia vary a good deal in size, in some parts being almost wholly immersed, while in others the free part is long and tubular.

In the Proceedings of the Linnean Society of New South Wales for 1881, is a contribution by Mr. Haswell, describing a species as *Mesenteripora repens* which may be identical with this, but there is no figure, and the description is scarcely sufficient for identification.

Explanation of Figures.

Plate 147.—Fig. 1, bilaminate specimen, natural size. Fig. 1*a*, one surface of a lobe from another specimen, showing the extension of the calcareous septum. Fig. 1*b*, another portion of the same, showing an encrusting portion, a bilaminate lobe, and an oœcium.

PLATE 147, FIG. 2.

DIASTOPORA CAPITATA (McG.).

DESCRIPTION.—Zoarium consisting of bilaminate lobes, rising from an encrusting layer, by narrow, stem-like portions, and expanding above; lamina separated by a thin, calcareous septum, slightly produced beyond the zoœcia. Zoœcia indistinct at their lower parts, more or less free and tubular above, minutely punctate.

REFERENCE.—P. H. MacGillivray, Trans. Roy. Soc. Vict., March 1886.

Port Phillip Heads, Mr. J. Bracebridge Wilson.

The only specimen I have seen consists of a cluster of four lobes, rising from an encrusting layer of zoœcia. Each lobe is narrowed and thicker below, expanded, thinner and undulated above, and usually divided into two secondary lobes. The summit of the lobes is flatter than in the last, and cellular from the openings of imperfectly formed zoœcia. The zoœcia are not so numerous on the stem-like portion, but increase in number and prominence upwards, until towards the summit they are considerably elongated to assume a corymbose appearance. In the encrusting part a few of the zoœcia are closed, the lid having a minute perforation in its centre.

These two species are interesting, as clearly showing the unstable nature of the characters on which the genus *Mesenteripora*, as proposed by Blainville and generally adopted, is founded. Mr. Hincks has also, in the British Marine Polyzoa, united the two genera.

EXPLANATION OF FIGURES.

PLATE 147.—Fig. 2, specimen, natural size. Fig. 2*a*, one of the isolated lobes, magnified.

PLATE 147, FIG. 3.

DIASTOPORA BICOLOR (McG.).

DESCRIPTION.—Zoarium adherent, nearly circular, consisting of three parts: a central elevated portion composed of perfect zoœcia, surrounded by a broad fringe of imperfectly developed zoœcia, beyond which is a thin calcareous lamina; central portion red, much raised, flat and depressed at the centre; the remaining parts glassy.

Zoœcia arranged in distinct, irregular, radiating series, slightly rugose and thickly punctate; mouth oval or elliptical, with slightly thickened margin; in the marginal zoœcia open, most of the inner closed by a punctate or perforated plate; towards the centre are numerous rounded eminences, mostly at the commencement of series of zoœcia, and of the same width, punctate or perforated in the same manner, but presenting no trace of mouth. Surrounding fringe consisting of a broad layer of imperfectly developed zoœcia, and the thin lamina beyond marked with slight, radiating grooves, as occurs in the corresponding part of other species.

Reference.—P. H. MacGillivray, Trans. Roy. Soc. Vict., Nov. 1884.

Port Phillip Heads, Mr. J. Bracebridge Wilson.

I have only seen two specimens—the perfect one figured, and another not so complete.

Explanation of Figures.

Plate 147.—Fig. 3, specimen, natural size. Fig. 3*a*, the same magnified.

Plate 147, Fig. 4.

DIASTOPORA SARNIENSIS (Norman).

Description.—Zoarium thick, encrusting, and irregularly shaped, or partly free at the margin. Zoœcia large, distinct, arranged in irregular lines, a considerable part free, especially in those towards the margin; surface smooth or transversely corrugated, thickly punctate, except in the peristome; mouth circular or elliptical, in many of those towards the centre closed by a calcareous plate, with a central, raised, tubular opening.

Reference.—Hincks, Brit. Mar. Polyzoa, p. 463, pl. lxvi., figs. 7–9.

Port Phillip Heads.

This species varies a good deal in size and shape. The zoœcia are thick, usually pretty prominent and free; the curious cover when present gives a ready means of distinction from the other species. I have not seen the oœcia, but they are described by Mr. Hincks as "transversely elongated, subelliptical inflations of the zoarium, of considerable size."

Explanation of Figures.

Plate 147.—Fig. 4, specimen, natural size. Fig. 4*a*, portion magnified. Fig. 4*b*, portion of same more highly magnified, showing the calcareous plates closing the orifices of several of the zoœcia.

PLATE 147, FIG. 5.

DIASTOPORA PATINA (LAMARCK, SP.).

DESCRIPTION.—Zoarium small, thin, usually more or less circular or elliptical, surrounded by an extension of the basal lamina. Zoœcia stout, thickly punctate, crowded, more immersed towards the centre, in more or less radiating lines towards the circumference and usually open; orifice in the central zoœcia elliptical or round and frequently closed by a minutely perforated calcareous plate, in those towards the margin elliptical or produced on one side. Oœcium a large inflation of the zoarium.

REFERENCE.—Hincks, Brit. Mar. Poly., p. 458, pl. lxvi., figs. 1–6.

Port Phillip Heads.

The specimens I have examined of this species are all small, silvery and encrusting. In Europe, where it is abundant, it seems to vary very much, being sometimes caliculate and partly free, and occasionally proliferous at the margins. A full account of these forms is given by Mr. Hincks.

EXPLANATION OF FIGURES.

PLATE 147.—Fig. 5, specimen, natural size. Fig. 5*a*, portion of same magnified, showing two central zoœcia closed by perforated plates and an oœcium.

The specimens and descriptions of our *Diastoporæ* on this plate I owe to Mr. MacGillivray.

FREDERICK MCCOY.

* 148
Collection

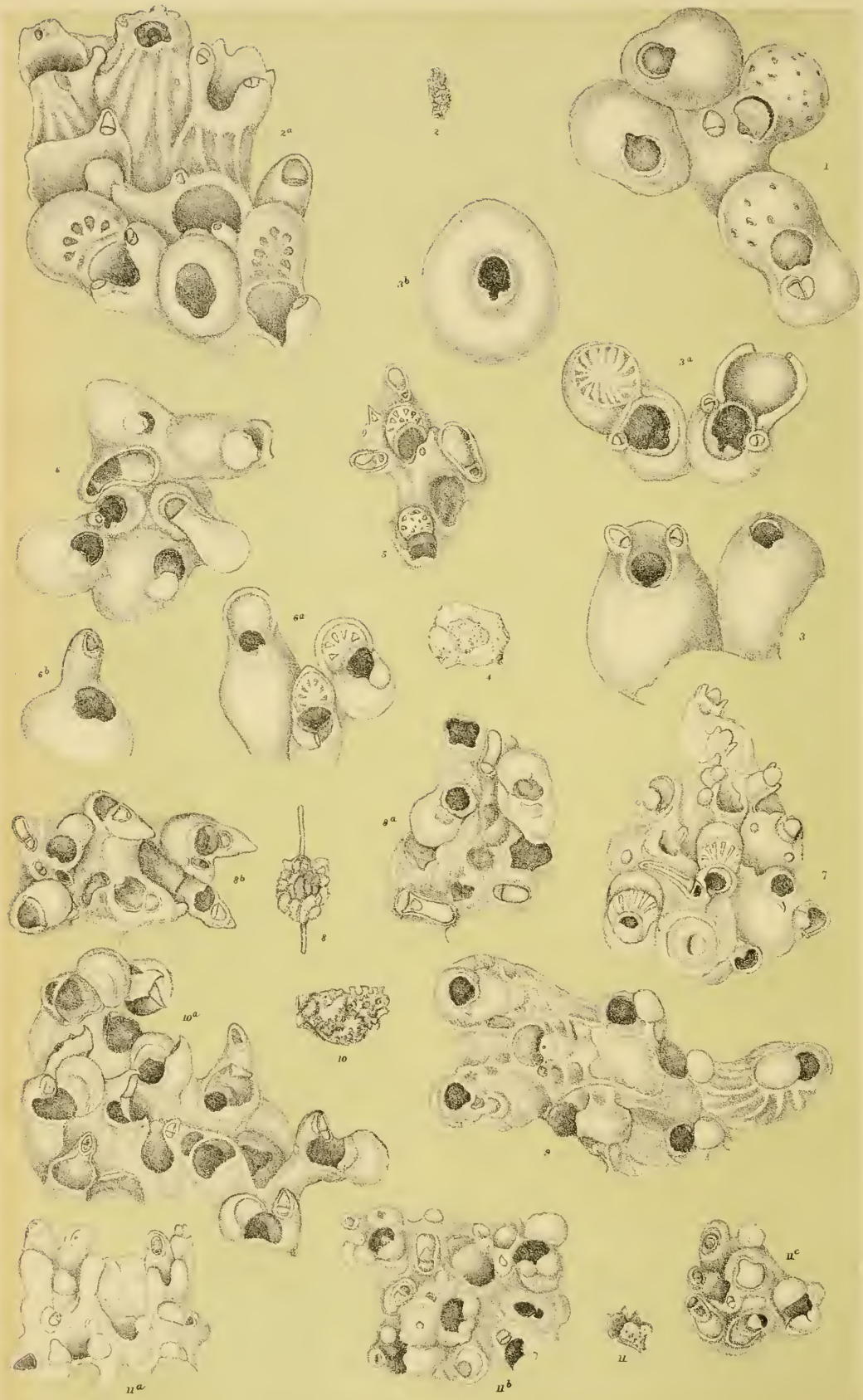

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PLATE 148, FIG. 1.

CELLEPORA MEGASOMA (McG.).

[Genus CELLEPORA (FABRICIUS). (Sub-kingdom Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Family Celleporidæ.)

Gen. Char.—Zoarium encrusting, partly adnate, massive, foliaceous, erect and ramose, or glomerulous. Zoœcia, in the older parts more or less erect and irregularly heaped together; one or more rostral processes (occasionally absent), usually bearing avicularia, in the neighbourhood of the mouth. Generally scattered vicarious avicularia.]

DESCRIPTION.—Zoarium encrusting. Zoœcia ovoid, irregularly arranged, frequently bulging below, and with an imperfect umbo. Mouth arched above, about as high as wide, with a sinus in the lower lip. Scattered avicularia, frequently a small one, with a nearly semicircular mandible, below or to one side of the mouth. Oœcia large, rounded, granular or pitted.

REFERENCES.—P. H. MacGillivray, *Lepralia megasoma*, Prod. Zool. Vict., plate 38, fig. 5; *Cellepora megasoma*, Trans. Roy. Soc. Vict., 1884.

Port Phillip Heads.

Forms an encrusting zoarium, occasionally of large size, one specimen measuring 2 inches by 1½ inches. The marginal zoœcia are decumbent, and I believe it was a cluster of these that I described as *Lepralia megasoma*. The others are more or less elevated. There is no proper mucro. The surface of the zoœcia is normally smooth, but in portion of one specimen in which most are so, a number have a series of longitudinal elevated ribs extending the whole length.

EXPLANATION OF FIGURE.

PLATE 148.—Fig. 1, small group of zoœcia, magnified, showing also two pitted oœcia; the oral sinus is not generally so sharply defined.

PLATE 148, FIG. 2.

CELLEPORA COSTATA (McG.).

DESCRIPTION.—Zoarium small, encrusting or attached to algæ or zoophytes. Zoœcia large, very irregular, mostly erect, surface strongly ribbed; mouth lofty, arched above, with a deep rounded sinus in the lower lip; two or more stout, thick processes at its sides, rounded at the summits and surmounted on the inner side by a conspicuous oval avicularium. Oœcia rounded, with a mitriform or semicircular sculptured area.

REFERENCE.—P. H. MacGillivray, Trans. Roy. Soc. Vict., 1868.

Port Phillip Heads; Wilson's Promontory; Portland, Mr. Maplestone; Warrnambool, Mr. Watts.

This species is of frequent occurrence, and is found in small masses usually attached to Polyzoa and Hydrozoa. The zoœcia are very irregular, distinct, and mostly nearly erect. The surface is beautifully fluted, with prominent convex ribs extending from the mouth to the base. These are sometimes thicker above, forming a prominent ridge round the mouth. There are usually two (occasionally more) thick, erect, calcareous processes at the sides of the mouth, either smooth or fluted like the surface of the zoœcia. Each is surmounted, towards the inner side, by an oval or elliptical avicularium, with the mandible directed downwards. There are also, occasionally, larger vicarious avicularia, on elevated calcareous processes, with nearly semicircular mandibles. The oœcia are of considerable size, extending nearly horizontally from the upper edge of the mouth. They are rounded, occasionally smooth, but mostly with a sculptured area. These markings are usually shallow, but in old specimens are much deeper and more numerous, and the area then has a sharply defined margin.

Explanation of Figures.

Plate 148.—Fig. 2, specimen, natural size. Fig. 2*a*, portion magnified, showing zoœcia previous to growth of oral processes; one with processes commencing to grow, and the others with one or two fully developed. The oœcia are of the usual appearance. A large vicarious avicularium is seen on the right.

Plate 148, Fig. 3.

CELLEPORA ROTA (McG.).

Description.—Zoarium encrusting. Zoœcia irregularly arranged, nearly erect, more or less globose, surface smooth or pitted; mouth with a deep sinus in the lower lip; on each side of the mouth an elevated process, surmounted by a short broad avicularium, the mandible broadly triangular with an obtuse point. Oœcia much raised, with a nearly circular, defined area marked by radiating grooves.

Reference.—P. H. MacGillivray, Trans. Roy. Soc. Vict., Dec. 1884.

Port Phillip Heads.

Allied to *C. costata*, with which it has been united by Mr. Waters, but certainly distinct. The zoœcia are distinct, little

prominent, in older specimens nearly globose. The surface is smooth or pitted, the pits occasionally, near the mouth, giving an obscurely ribbed appearance. The peristome forms a thin rim, with occasionally a prominence on each side, on the summit of which is an oval or broadly elliptical avicularium, the mandible directed upwards and outwards.

Explanation of Figures.

Plate 148.—Fig. 3, two zoœcia from the growing edge. Fig. 3*a*, two zoœcia, with growing and mature oœcia. Fig. 3*b*, vertical view of zoœcium to show the mouth.

Plate 148, Figs. 5–6.

CELLEPORA COSTAZEI, var. (Audouin).

Description.—Zoarium encrusting. Zoœcia ovate, smooth, irregularly arranged, confused; mouth wide, with a broad rounded sinus in the lower lip; usually a prominent mucro below the mouth, supporting a small avicularium and occasionally an aviculiferous process from the peristome on one or both sides. Numerous scattered avicularia, some very large, with broadly expanded spatulate mandibles. Oœcia of moderate size, with a rounded or mitriform area, bounded by a distinct, raised margin, pitted or sculptured in a radiate manner.

References.—P. H. MacGillivray, Trans. Roy. Soc. Vict., 1884; typical form, Hincks, Brit. Mar. Pol., p. 411, pl. 55, figs. 11–14; typical form, *C. Hassallii*, Busk, Brit. Mus. Cat. Mar. Pol., pt. ii. p. 86, pl. cix., figs. 4–6.

Port Phillip Heads.

There may be some doubt as to the identification of this with the European species. It differs in the general absence of the elevated avicularia on the sides of the mouth, which are only occasionally found on one side. In an English specimen, however, they are also absent in many of the zoœcia. The sub-oral mucro is also generally wanting in English specimens. The vicarious avicularia are also larger in the Australian form. I had at first intended to describe it as a new species under the name of *C. spatula*, which may be retained as that of the variety.

Explanation of Figures.

Plate 148.—Fig. 5, portion of specimen, magnified. Fig. 6, portion of another specimen. Fig. 6*a*, oœcia of same. Fig. 6*b*, single zoœcium, with avicularium on high process.

PLATE 148, FIG. 7.

CELLEPORA PLATALEA (McG.).

DESCRIPTION.—Zoarium very small, pisiform, glassy. Zoœcia very small, rounded, irregularly heaped; mouth slightly hollowed below, but without a distinct sinus; frequently a broad sub-oral mucro. Avicularia with very long, slender spatulate mandibles. Oœcia globular, with a distinct arched area with radiating grooves.

REFERENCE.—P. H. MacGillivray, Trans. Roy. Soc. Vict., Nov. 1884.

Port Phillip Heads, and probably common.

A very minute species, distinguished by the markings on the area of the oœcium, and the very long, narrow avicularia.

EXPLANATION OF FIGURE.

PLATE 148.—Fig. 7, portion of specimen, magnified.

PLATE 148, FIG. 8.

CELLEPORA GLOMERATA (McG.).

DESCRIPTION.—Zoarium very small, pisiform, glomerular, attached to stems of zoophytes. Zoœcia very irregularly heaped; mouth with a shallow sinus in the lower lip; in young zoœcia a long superior mucro with a sessile avicularium on the inner aspect; in older zoœcia a short, thick, sub-oral mucro with a small avicularium at the summit or internally; scattered vicarious avicularia, with broadly spatulate mandibles. Oœcia small, globular, smooth and glossy, or occasionally (when young) with a small mark on the front.

Port Phillip Heads, on Zoophytes.

A minute species, distinguished by its glomerulate mode of growth, the smooth oœcia, and the broadly spatulate avicularia.

EXPLANATION OF FIGURES.

PLATE 148.—Fig. 8, specimen, natural size. Fig. 8*a*, portion of same, magnified, showing young oœcia and avicularia. Fig. 8*b*, portion of same, showing marginal zoœcia with superior processes.

PLATE 148, FIG. 9.

CELLEPORA VITREA (McG.).

DESCRIPTION.—Zoarium small, encrusting, glassy. Zoœcia elongated, distinct, horizontal at the margins, more confused centrally; margins areolated or surface traversed by prominent glassy ribs; mouth with a rather wide and not very deep sinus on the lower lip; a large, broad, smooth mucro below the mouth.

Port Phillip Heads, a single specimen, Mr. J. B. Wilson.

I have some doubt whether to refer this species to *Cellepora* or *Schizoporella*. The marginal zoœcia are quite horizontal, those further removed confused, but not so erect as usual in *Cellepora*. The sub-oral rostrum seems to be unarmed, but it is possible that there may be an avicularium on its internal surface. I have another specimen which seems to belong to the same species. In it the zoœcia are shorter, some smooth, but others with glassy elevations, the sub-oral process rises and curves forward, or occasionally inclines to one side, and has a small avicularium on the inner surface towards the summit. The oœcia are rounded, with a small, nearly circular area, punctate within the margin. There are also several vicarious avicularia with spatulate mandibles. This latter specimen agrees with Busk's *C. signata* of the "*Challenger*" Polyzoa in the markings of the oœcia and the vicarious spatulate avicularia, but differs in the sub-oral mucro and in the wider and shallower sinus.

Explanation of Figure.

Plate 148.—Fig. 9, portion of specimen, magnified.

Plate 148, Fig. 10.

CELLEPORA TIARA (McG.).

Description.—Zoarium minute, encrusting. Zoœcia small, rather short, smooth, confused; primary mouth with a rather deep, narrow, slit-like sinus; peristome considerably developed, with a stout, thick mucro at one side, usually slightly overarching the mouth, and surmounted by a comparatively large avicularium with broadly triangular mandible. Oœcia sub-globular, reclinate, with a sub-triangular, smooth, or sculptured area.

Port Phillip Heads.

The few specimens I have are all growing on *Retepora monilifera*. It is distinguished by the thick, incurving oral mucro and the character of the area on the front of the oœcium.

Explanation of Figures.

Plate 148.—Fig. 10, specimen, natural size, encrusting Retepore. Fig. 10*a*, portion of ame, magnified. In all the zoœcia the primary mouth is obscured by the peristome.

Plate 148, Fig. 11.

CELLEPORA BENEMUNITA (McG.).

Description.—Zoarium small, encrusting. Zoœcia small, confused, heaped; primary mouth with a sub-oral sinus; several short, thick processes developed in the neighbourhood of the mouth, surmounted by small avicularia with spatulate or linguate mandibles. Numerous vicarious avicularia, with broadly spatulate mandibles. Oœcia small, sub-globular.

Port Phillip Heads, Mr. J. Bracebridge Wilson.

The only specimen I have seen is very small. It is readily distinguished by the numerous short, glassy processes (many surmounted by avicularia) in the neighbourhood of the mouth, the numerous vicarious avicularia, and the smooth oœcia.

Explanation of Figures.

Plate 148.—Fig. 11, specimen, natural size. Fig. 11*a*, portion from a growing edge, magnified. Fig. 11*b*, other portions of the same.

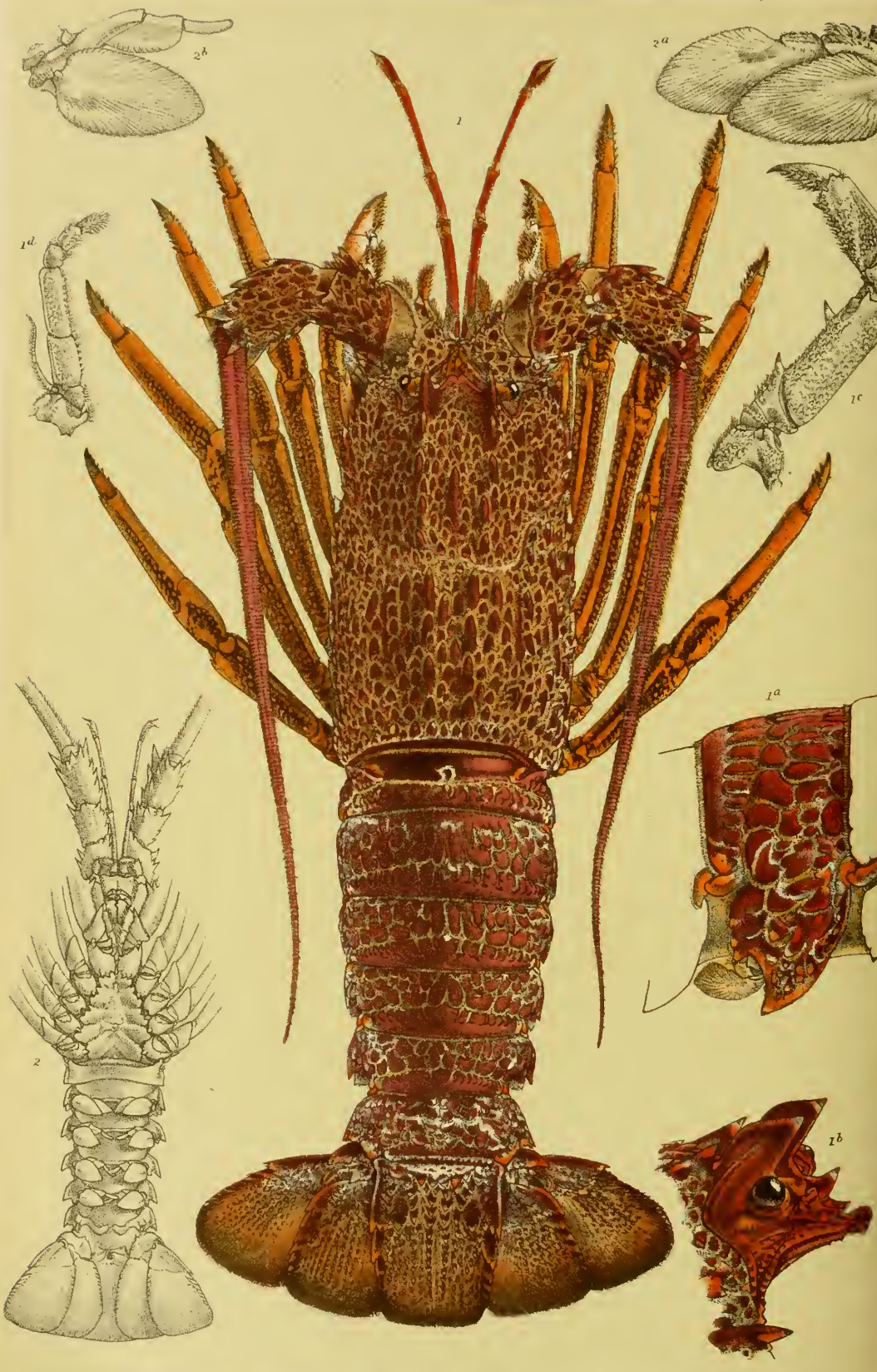
Figures of the opercula and avicularian mandibles will be given when the remaining Celleporæ are described.

The important genus *Cellepora* illustrated on this plate continues a series, the specimens and descriptions of which have been contributed to the National Museum and this work by Mr. MacGillivray.

Frederick McCoy.

ZOOLOGY OF VICTORIA

(Crustacea)



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Plates 149 and 150.

PALINURUS LALANDI (Lam. MSS.).

Southern Spiny Lobster (Melbourne Crawfish).

[Genus PALINURUS (Fabr.). (Restricted to Milne Edwards, first section, with rostrum, &c.). (Sub-kingdom Articulata. Class Crustacea. Order Decapoda. Section Macroura. Tribe Astacidea. Family Palinuridæ.)

Gen. Char.—Carapace subcylindrical, broadly rounded on sides, with a small rostrum. Antennary segment very narrow above. Antennæ without basal scale, nearly in contact at base, covering the inner antennæ; basal joints long, subcylindrical, flagella of inner antennæ very short. Anterior legs monodactyle. Sternum trigonal.]

Description.—*Male:* Carapace covered with large, flattened, ovate, sub-spinose tubercles, each with a narrow fibrous fringe on front and sides; two rows of narrow and more pointed spines extending backwards from each supraocular spine, largest in front, and four or five extending half-way back on sides from a large spine in middle of front lateral margin, and a few similar ones irregularly scattered. Two supraocular spines, large, smooth, inclining obliquely forwards, with a straight front edge and convex posterior edge. Rostrum small, more advanced than the supraocular spines, but not reaching front edge of carapace, varying from straight and horizontal (which is rare) to much arched upwards (which is the most common), and straight and pointed vertically upwards (which is the least common); on each side of base of rostrum a lunate extension, with its posterior spine directed upwards and its anterior spine upwards and forwards. Abdominal segments with three or four irregular transverse rows of large, flattened, scale-like tubercles, very irregular in size and shape, each fringed with short fibres; each segment ending laterally in a large compressed spine arched backwards, behind which is one small, strong, flattened spine, the edge beyond which is usually smooth, but sometimes showing two to five small tooth-like serratures; anterior legs with a small conical spine at distal lower edge of penultimate joint; no spine on antepenultimate joint; a very large, conical, compressed spine on anterior third of lower edge of third joint; the largest conical spine on anterior lower edge of second joint of first pair of legs, with from one to four very small ones on ridge immediately behind its base; all the five legs have the upper ridge of third joint terminating in a sharp, conical spine directed forwards; rarely there is a very small spine at the inner base of the constant ridge-spine on some of the legs, and, still more rarely, a third small spine on outer edge. *Colour:* Dorsal aspect of carapace rich, brownish purple-madder, the fringed edges of scale-shaped tubercles lighter yellowish-brown; rostrum and superciliar spines redder and tipped with light orange-red; lateral portion of hepatic region whitish, with tubercles of colour of back; an irregular, narrow, whitish line from anterior end of nuchal furrow to posterior lateral angle of carapace; large antennæ nearly colour of back, more pink, fringed edges of joints lighter, and with spines on basal portion tipped with orange-red; smaller antennæ colour

of back with the distal ends of joints orange-red. Legs with tubercles, ridges and extremities bright orange-red, relieved by a depressed ground colour, like back, on the sides; inner portion of penultimate joint, and of all the others, except the terminal and antepenultimate joint of anterior leg, whitish; sternum and basal joint of other legs whitish on tubercles and prominent parts, with a purplish colour, like back, as ground colour on depressed portions. Abdomen same purple-madder colour as carapace, with the lateral spines tipped with bright orange red; tail fins dull orange in middle, with longitudinal rows of tubercles and margins of purple-madder of back, becoming darker at distal end; narrow lateral ridge and points of tubercles on lateral edges orange-red. *Measurements:* Total length from tip of snout to end of tail flaps, 1 ft. 6 in. Proportional measurements to total length, as 100:—Length of thorax, $\frac{37}{100}$; length from thorax to penultimate joint of abdomen, $\frac{44}{100}$; greatest width of thorax, $\frac{37}{100}$; depth of thorax, $\frac{17}{100}$, greatest width of abdomen, $\frac{20}{100}$; length of telson, $\frac{19}{100}$; greatest width of telson near end, $\frac{15}{100}$; length of first three joints of outer antennæ, $\frac{30}{100}$; width of ditto, $\frac{7}{100}$; length of flagella of outer antennæ, $\frac{75}{100}$; length of rostrum, $\frac{3}{100}$; length of supraorbital spines, $\frac{5}{100}$; length of first joint of inner antennæ, $\frac{15}{100}$; second joint, $\frac{8}{100}$; third joint, $\frac{10}{100}$; flagella, $\frac{6}{100}$; length of first pair of legs, $\frac{47}{100}$; second pair, $\frac{60}{100}$; third pair, $\frac{70}{100}$; fourth pair, $\frac{60}{100}$; fifth pair, $\frac{50}{100}$; greatest width of first leg (at middle of penultimate joint), $\frac{7}{100}$. *Female:* The last pair of legs subchelate by the large conical upcurved spine on lower margin of anterior edge; the spines on lower surface of joints of anterior pair of legs are smaller than in the male of same size, especially those on the penultimate joint; the rostrum is also a little smaller than in the male, which it otherwise resembles.

Reference.—Milne Edw. Hist. Crust., v. 2, p. 293; =*P. Edwardsi*, Hutton An. Nat. Hist., Jan. 1875, p. 42;=*P. Paulensis*, Heller Verhandlungen der K. K. Zool. Bot. Gesellschaft in Wien 1862, p. 525.

This fine and very interesting species has not been properly figured before, and is consequently a source of some perplexity to naturalists. It was first described from the Cape of Good Hope by Prof. Milne Edwards, from the specimens in the Paris Museum named in manuscript *P. Lalandi* by Lamarck; and, many years ago, the late Dr. Gray and Mr. Adam White in their "List," published in 1847, referred two specimens in the British Museum to it, one from New Zealand and one from S. Africa. Capt. Hutton subsequently described the New Zealand *Palinurus* under the name of *P. Edwardsi*, distinguishing it from *P. Lalandi* by its smaller size ($9\frac{1}{2}$ in.), by the upcurved beak (said by him to be straight and conical in *P. Lalandi*), in having no spine on the penultimate joint of the anterior legs, and in having a second small spine at the distal extremity of the third joint of the last four pairs of legs. In the female of *P. Edwardsi* the rostrum is said by Prof. Hutton to be wanting.

As I have always referred our species to the *P. Lalandi*, and believed it to be identical with the New Zealand and Tasmanian, as well as the South African one, I felt obliged to investigate those supposed differences carefully. On going to the British Museum I found, after some difficulty, the specimens (one presented by Dr. Andrew Smith, from the Cape of Good Hope, and the New Zealand one from Mr. Percy Earl's collection) referred by Gray to *P. Lalandi* (now re-labelled *P. Edwardsi*) and found the New Zealand and the Cape specimens belonged clearly to one species, and, as I had many years ago published the belief, identical also with the Victorian species. I here also found a specimen sent to the Indian and Colonial Exhibition from the New Zealand Government as *P. Edwardsi*, about twice the size mentioned by Prof. Hutton, and agreeing in this respect with our ordinary examples and the size (15 in.) published by Milne Edwards for the original types of *P. Lalandi* from the Cape; so that difference of size does not hold even in New Zealand. The second characteristic of *P. Edwardsi*—having the rostrum curved upwards, instead of straight, as said by Capt. Hutton of *P. Lalandi*—gave me much trouble, as the shape of the rostrum is not mentioned by Milne Edwards in his work for Lamarck's species, and so I thought it necessary to go to Paris to examine the original type in the *Jardin des Plantes Museum*, and having, with the kind assistance of Dr. Fisher, found the original specimen, I ascertained that the rostrum curved gently upwards in the S. African type.

I figure now our most common upward-curved rostrum (Plate 149, fig. 1*b*), and the much rarer, perfectly straight, horizontal rostrum (Plate 150, fig. 2), between which the original Cape type specimens in the Paris Museum, as well as by far the greater number of our Victorian ones, are intermediate. One of our Victorian female specimens has the rostrum straight, but directed almost vertically upwards (Plate 150, fig. 1). The females of *P. Edwardsi* are said by Capt. Hutton to have no rostrum ; in our specimens (except occasional absences from malformation in both sexes) the female has the rostrum as in the male, but rather smaller, as is true generally of all spines. As to the existence of a small, anterior, second spine at the distal extremity of the third

joint of the last four pairs of legs, given as a characteristic difference of *P. Edwardsi* from *P. Lalandi*, I find, although usually absent in our species, it is sometimes present, and sometimes present on some of the legs and absent on others of the same individual, as represented on Figs. 3 and 3*a* of our Plate 150, in which the two last pairs of legs have them, and those in front have not. This is, therefore, obviously not a constant character, and a few specimens show a third small spine on the outer edge of the same part. All the spines are smaller, proportionally, in small specimens, and that on the inner side of the penultimate joint of the anterior pair of legs may occasionally disappear in so small an example (9·5 in.) as that described by Capt. Hutton. Our figure, Plate 149, fig. 1*c*, shows how small it is in a specimen a foot long, and our figure Plate 150, fig. 6, shows the much greater development of the spines at the more nearly adult size of 18 in. in total length. This being so, I think it might be so small in a 9 inch specimen as to almost warrant the statement that it was absent, and raises a doubt on this distinctive character when individuals of very different sizes are compared.

I suggest the trivial name of Southern Rock Lobster for this species, which, abounding in Victoria, Tasmania, and New Zealand, as well as the Cape of Good Hope, (and St. Paul's, according to Heller,) does not appear to have been noticed as far north as Sydney, where it is replaced by a totally different species, the Common Sydney Crawfish *P. Hügelli*, of which I have one specimen from our coast and one from Tasmania, as excessively rare occurrences as stragglers.

Very abundant in pools on the rocky coasts of Victoria, and is the common Melbourne Crayfish of the fishmongers.

Explanation of Figures.

Plate 149.—Fig. 1, immature specimen, half the natural size, viewed from above. Fig. 1*a*, half of third abdominal segment, natural size, showing the flattened, scale-like tuberculation, with two serratures behind the large spine on posterior edge of pleura. Fig. 1*b*, ordinary shape of upward-arched rostrum, natural size. Fig. 1*c*, anterior leg with moderately developed spines on inner edge of second, third, and penultimate joints, half the natural size. Fig. 1*d*, jaw-foot, half the natural size. Fig. 2, underside of female, one-quarter the natural size, showing the trigonal sternum. Fig. 2*a*, appendage of second abdominal segment of female, showing the two large laminæ, natural size. Fig. 2*b*, appendage of third abdominal segment, with one, large, membranous lamina, natural size.

PLATE 150.—Fig. 1, portion of female, showing a straight-edged rostrum with an unusual direction, nearly vertically upright and a little forward, natural size. Fig. 2, portion of a male specimen, showing a straight-edged rostrum with a nearly horizontal upper edge, directed forwards and very slightly upwards, natural size. Fig. 3, distal end of third joint of third leg, showing the usual single spine, natural size. Fig. 3*a*, distal end of third joint of fourth leg of same specimen as fig. 3, showing the comparatively rare, second, anterior, smaller spine, supposed characteristic of *P. Edwardsi*, found on the fourth and fifth legs of this specimen, but not on the second or third. Fig. 4, distal end of third joint of fourth leg of another specimen, showing the more common, single spine of same leg. Fig. 5, last or fifth leg of female, showing sub-chelate character, natural size. Fig. 4*a*, same hind or fifth leg of male, showing its simple termination, natural size. Fig. 6, claw or anterior leg of old male, natural size. Fig. 7, outer end of third segment with the posterior edge behind the spine, smooth and destitute of spines or serratures, natural size. Fig. 8, outer ends of second and third abdominal segments of another specimen, showing three and five serratures respectively on posterior edge behind the spine. Fig. 9, female appendage of second abdominal segment, natural size. Fig. 9*a*, ditto of third abdominal segment.

FREDERICK MCCOY.

CONTENTS OF DECADES.

N.B.—The originals of all the Figures are in the National Museum, Melbourne.

DECADE I.

PLATE 1.—The Black Snake (Pseudechys porphyriacus, Shaw sp.).
PLATE 2.—The Copper-head Snake (Hoplocephalus superbus, Günth.).
PLATE 3.—The Tiger Snake (Hoplocephalus curtus, Schl. sp.).
PLATE 4.—The Australian Bream (Chrysophrys Australis, Günth.).
PLATE 5.—The Spiny-sided Butterfly-Gurnard (Lepidotrigla Vanessa, Rich. sp.).
PLATE 6.—The Kumu Gurnard (Trigla Kumu, Lesson and Garn.).
PLATE 7.—The Australian Giant Earth-worm (Megascolides Australis, McCoy).
PLATE 8.—Lewin's Day-moth (Agarista Lewini, Boisd.).
The Loranthus Day-moth (Agarista Casuarinæ, Scott).
The Vine Day-moth (Agarista Glycine, Lewin sp.).
PLATE 9.—Pieris (Thyca) Harpalyce (Don. sp.).
PLATE 10.—Pieris (Thyca) Aganippe (Don. sp.).

DECADE II.

PLATE 11.—The Little Whip Snake (Hoplocephalus flagellum, McCoy). The White-lipped Snake (Hoplocephalus coronoides, Günth.).
PLATE 12.—The Death Adder (Acanthophis Antarctica, Shaw sp.).
PLATE 13.—The Carpet Snake (Morelia variegata, Gray).
PLATE 14.—The Gippsland Perch (Lates colonorum, Günth.).
PLATE 15.—The Murray Lobster (Astacopsis serratus, Shaw sp.).
PLATE 16.—The Salmon Arripis (Arripis truttaceus, Cuv. sp.). Adult.
PLATE 17.—Ditto of the younger forms and coloring.
PLATE 18.—The Horse Mackerel (Trachurus trachurus, Lin. sp.).
PLATE 19.—The Small-scaled Rock Cod (Lotella callarias, Günth.).
PLATE 20.—The Australian Rock Cod (Pseudophysis barbatus, Günth.).

DECADE III.

PLATE 21.—The Sea-Leopard Seal (Stenorhynchus leptonyx, de Blainv. sp.).
PLATE 22.—The Yellow-sided Dolphin (Delphinus Novæ Zealandiæ, Quoy and Gaim.).
PLATE 23.—The Common Brown Snake (Diemenia superciliosa, Fisch.).
The Small-scaled Brown Snake (Diemenia microlepidota, McCoy).
The Shield-fronted Brown Snake (Diemenia aspidorhyncha, McCoy).
PLATE 24.—Catenicella margaritacea (Busk).—C. plagiostoma (Busk).—C. ventricosa (Busk).—C. hastata (Busk.)—C. rufa (McG.).—C. cribraria (Busk).—C. alata (Wyv. Thomson).—C. lorica (Busk).—C. formosa (Busk).—C. elegans (Busk).—C. perforata (Busk).—C. Buskii (Wyv. Thomson).—C. Hannafordi (McG.).—C. crystallina (Wyv. Thomson).—C. carinata (Busk).—C. aurita (Busk).—C. geminata (Wyv. Thomson).—C. cornuta (Busk).—C. intermedia (McG.)
PLATE 25.—Membranipora membranacea (Linn. sp.).—M. perforata (McG.).—M. ciliata (McG.).—M. mamillaris (McG.).—M. umbonata (Busk).—M. pilosa (Linn. sp.).—M. cervicornis (Busk).
PLATE 26.—Membranipora dispar (McG.).—M. Woodsii (McG.).—M. lineata (Linn. sp.).—M. Rosselii (Audouin sp.).—M. Lacroixii (Savigny sp.).
PLATE 27.—The Australian Rockling (Genypterus Australis, Cast.).
The Yarra Blackfish (Gadopsis gracilis, McCoy).
PLATE 28.—The Southern Mackerel (Scomber pneumatophorus, De la Roche).
PLATE 29.—The Yabber Crayfish (Astacopsis bicarinatus, Gray sp.).
PLATE 30.—The Large Wattle Goat-Moth (Zeuzera Eucalypti, Boisd. Herr.-Schæf.).

DECADE IV.

PLATE 31.—The Australian Sea-Bear or Fur-Seal (Euotaria cinerea, Péron sp.).
PLATE 32.—The Two-hooded Furina-Snake, Furina bicucullata (McCoy).
PLATE 33.—The Banded Red Gurnet-Perch (Sebastes percoides, Solander sp.).
PLATE 34.—The Angel-fish (Rhina squatina, Lin. sp.).
PLATE 35.—Lepralia circinata (McG.).—L. Cecilii (Aud.).—L. diaphana (McG.).—L. marsupium (McG.).—L. subimmersa (McG.).—L. anceps (McG.).—L. Maplestonei (McG.).
PLATE 36.—Lepralia vittata (McG.).—Membranipora perforata. Lepralia Brogniartii (Aud.).—L. elegans (McG.).—L. pertusa (Esper. sp.).—L. Malusii (Aud. sp.).—L. lunata (McG.).
PLATE 37.—Lepralia ciliata (Linn. sp.).—L. trifolium (McG.).—L. cheilodon (McG.).—L. canaliculata (McG.).—L. larvalis (McG.).—L. diadema (McG.).—L. papillifera (McG.).—L. Ellerii (McG.).
PLATE 38.—Lepralia monoceros (Busk).—L. excavata (McG.).—L. vitrea (McG.).—L. megasoma (McG.).—L. Schizostoma (McG.).—L. Botryoides (McG.).—L. ferox (McG.).—L. pellucida (McG.).
PLATE 39.—Crisia Edwardsiana (D'Orb. sp.).—C. biciliata (McG.).—C. acropora (Busk).—C. setosa (McG.).—C. tenuis (McG.).
PLATE 40.—Saunders' Case-Moth (Metura elongata, Saunders sp.).
The Lictor Case-Moth (Entometa ignobilis, Walk.).

DECADE V.

PLATE 41.—The Lace Lizard (Hydrosaurus varius, Shaw sp.).
PLATE 42.—The Spotted Marsh-Frog (Limnodynastes Tasmaniensis, Günth.).—The Common Sand-Frog (Limnodynastes dorsalis, Gray).
PLATE 43.—The Carpet Shark (Crossorhinus barbatus, Lin. sp.).—The Seven-gilled Shark (Notidanus [Heptanchus] Indicus, Cuv.).
PLATE 44.—The Barracouta (Thersites atun, Cuv.).—The Tunny (Thynnus Thynnus, Lin. sp.).
PLATE 45.—Flustra denticulata (Busk).—Carbasea episcopalis (Busk).—C. dissimilis (Busk).—C. indivisa (Busk).—C. elegans (Busk).—C. pisciformis (Busk).
PLATE 46.—Spiralaria florea (Busk).—Diachoris Magellanica (Busk).—D. spinigera (P. McGil.).—Dimetopia spicata (Busk).—D. cornuta (Busk).—Didymia simplex (Busk).—Calwellia bicornis (Wyv. Thomson).
PLATE 47.—Dictyopora cellulosa (P. McGil.).
PLATE 48.—Eschara obliqua (P. McGil.).—E. dispar (P. McGil).—E. gracilis (Lamx.).—E. platalea (Busk).—E. quadrata (P. McGil.)—E. mucronata (P. McGil.).—Caleschara denticulata (P. McGil.).
PLATE 49.—Cellaria fistulosa (Linn.).—C. hirsuta (P. McGil.).—C. tenuirostris (Busk.).—C. gracilis (Busk).—Nellia oculata (Busk).—Tubucellaria hirsuta (Busk).
PLATE 50.—The Great Black, or Manna Cicada (Cicada mœrens, Germ.).—The Great Green Cicada (Cyclochila Australasiæ, Donov. sp.).

DECADE VI.

PLATE 51.—The Victorian Rhodona (Rhodona Officeri, McCoy).
PLATE 52.—The Black and White Ringed Snake (Vermicella annulata, Gray).
PLATE 53.—The Green and Golden Bell-Frog (Ranoidea aurea, Less. sp.).
PLATES 54-55.—The Australian Aulopus (Aulopus purpurisatus, Rich.).
PLATE 56.—The Hammer-headed Shark (Zygæna malleus, Shaw).—The Common Australian Saw-Fish (Pristiophorus nudipinnis, Günth.).
PLATE 57.—Biflustra perfragilis (McGil.).—B. delicatula (Busk).
PLATE 58.—Cellularia cuspidata (Busk).—Menipea crystallina (Gray sp.).—M. cyathus (Wyv. Thomson).—M. cervicornis (McGil.)—M. tricellata (Busk).—M. Buskii (Wyv. Thomson).
PLATE 59.—Bicellaria tuba (Busk).—B. grandis (Busk).—B. ciliata (Linn).—B. turbinata (McGil.).—Stirparia annulata (Map.).—Bugula neritina (Linn.).
PLATE 60.—Steganoporella magnilabris (Busk. sp.).—Petralia undata (McGil.),

DECADE VII.

PLATE 61.—The Tuberculated Argonaut (Argonauta oryzata, Meusch.).
PLATE 62.—The same seated in its so-called shell or Paper-Nautilus.
PLATE 63.—The Blue-spotted Eagle-Ray (Myliobatis Australis, Macleay).
PLATE 64.—The Long-toothed Bull-Shark (Odontaspis taurus, Raf.).—The Australian Tope Shark (Galeus Australis, Macleay).
PLATE 65 —The Leafy Sea-Dragon (Phyllopteryx foliatus, Shaw sp.).—The Short-headed Sea-horse (Hippocampus breviceps, Pet.)
PLATE 66.—Dictyopora grisea (Lamx. sp.).—D. albida (Kirch.)—(Var. avicularis, P. McGill.).
PLATE 67.—D. Wilsoni (P. McGill.).
PLATE 68.—Idmonea Milneana (d'Orb.).—I. contorta (P. McGill.).—I. radians (Lamk.).
PLATES 69–70.—The Violet-shouldered Phasma (Tropidoderus iodomus, McCoy).—The Red-shouldered Phasma (Tropidoderus rhodomus, McCoy).

DECADE VIII.

PLATE 71.—The Australian Sea-Bear or Fur-Seal (Euotaria cinerea, Péron sp.).
PLATE 72.—The Northern Blue-tongued Lizard (Cyclodus gigas, Bodd. sp.).
PLATE 73.—The Ludrick (Girella simplex, Rich. sp.).
PLATE 74.—The White Shark (Carcharodon Rondeletii, Müll. and Hen.).
PLATE 75.—The Picked Dog-Fish (Acanthias vulgaris, Linn. sp.).
PLATES 76–77.—The Australian Tooth-cupped Cuttlefish (Sepioteuthis Australis, Quoy and Gaim.).
PLATE 78.—Bugula robusta (P. McGil.).—B. cucullata (Busk).—B. dentata (Lamx.).—B. avicularia (Pall.).
PLATE 79.—The Violet-winged Phasma (Acrophylla violascens, Leach sp.).
PLATE 80.—The Large Pink-winged Phasma (Podacanthus typhon, Gray).

DECADE IX.

PLATE 81.—The Gippsland Water Lizard (Physignathus Lesueri, Gray)—(Var. Howitti, McCoy).
PLATES 82–83.—The Murray Tortoise (Chelymys Macquaria, Cuv. sp.).
PLATE 84.—The Murray Golden Perch (Ctenolates ambiguus, Rich. sp.).
PLATES 85–86.—The Murray Cod-Perch (Oligorus Macquariensis, Cuv. and Val. sp.).
PLATE 87.—The Australian Smooth-Hound (Mustelus Antarcticus, Günth.).
PLATE 88.—The Thresher, or Long-tailed Shark (Alopecias vulpes, Linn. sp.).
PLATE 89.—Catenicella intermedia (P. McG.).—C. amphora (Busk).—C. Wilsoni (P. McG.).—C. pulchella (Map.).—C. utriculus (P. McG.).
PLATE 90.—Catenicella fusca (P. McG.).—C. umbonata (Busk).—C. cornuta (Busk).

DECADE X.

PLATE 91.—Gymnobelideus Leadbeateri (McCoy).
PLATES 92–93.—The Long-necked River Tortoise (Chelodina longicollis, Shaw sp.).
PLATE 94.—Opercula of Retepora.
PLATE 95.—Retepora porcellana (P. McGil.).—R. avicularis (P. McGil.).—R. fissa (P. McGil.).
PLATE 96.—Retepora monilifera (P. McGil.).
PLATE 97.—Retepora monilifera (P. McGil.).—R. formosa (P. McGil.).—R. carinata (P. McGil.).
PLATE 98.—Retepora Phœnicea (Busk).—R. aurantiaca (P. McGil.).
PLATE 99.—Retepora granulata (P. McGil.).—R. tessellata (Hincks).—R. serrata (P. McGil.).
PLATE 100.—Goniocidaris tubaria (Lam.).

The foregoing ten Decades form Vol. I.

DECADE XI.

PLATE 101.—The Luth, or Leathery Turtle (Sphargis coriacea, Linn. sp.).
PLATE 102.—The Rugged Stump-tail, or Shingle-back, Lizard (Trachydosaurus rugosus, Gray).
PLATE 103.—The Blackish Australian Worm-Snake (Typhlops nigrescens, Gray sp.).
PLATE 104.—The Basking Shark (Cetorhinus maximus, Linn. sp.).
PLATE 105.—Cellaria rigida (McG.).—Tubucellaria cereoides (Ellis and Solander).—Urceolipora dentata (McG.)—U. nana (McG.).
PLATE 106.—Amphiblestrum punctigerum (Hincks). — A. Flemingii (Busk). — A. permunitum (Hincks).—Pyripora crassa (McG.).—P. catenularia (Jameson).—P. polita (Hincks).—Electra flagellum (McG.). — Bathypora porcellana (McG.).—Biflustra papulifera (McG.).—B. bimamillata (McG.).
PLATE 107.—Catenicellopsis pusilla (J. B. Wilson). — C. delicatula (J. B. Wilson). — Calpidium ponderosum (Goldstein sp.).
PLATE 108.—Calpidium ornatum (Busk).—Chlidonia dædala (Wyv. Thomson).
PLATE 109.—The Great Green Gum-tree Grasshopper (Locusta vigentissima, Serv.).
PLATE 110.—The Australian Yellow-winged Locust (Œdipoda musica, Fab. sp.).

DECADE XII.

PLATE 111.—The Blood-sucker (Grammatophora muricata, Shaw, sp.).
PLATE 112.—The Southern Chimæra (Callorhynchus antarcticus, Lacép. sp.).
PLATE 113.—The Port Jackson Shark, or Bull-dog Shark (Heterodontus Phillipi, Lacép. sp.).
PLATE 114.—The Australian Rough Fish (Trachichthys Australis, Shaw).
PLATE 115.—The Skip-jack Pike (Lanioperca mordax, Günth.).
PLATE 116.—Beania mirabilis (Johnst.).—Mucronella tricuspis (Hincks).—M. lævis (P. McG.).—M. vultur (Hincks).—Cyclicopora longipora (P. McG.).
PLATE 117.—Beania decumbens (P. McG.). — B. costata (Busk sp.). — B. Crotali (Busk sp.). — B. radicifera (Hincks sp.).—Amphiblestrum patellarium (Moll sp.).
PLATE 118.—Hornera foliacea (P. McG.).—H. robusta (P. McG.).
PLATE 119.—The Smaller Green Gum-tree Grasshopper (Phaneroptera valida, Walk.).
PLATE 120.—The Thirty-two Spotted Grasshopper (Phaneroptera [Ephippitytha] trigintiduoguttata, Serv.).

DECADE XIII.

PLATE 121.—The Bearded Lizard (Grammatophora barbata, Kaup).
PLATE 122.—The Southern Silver Ribbon-fish (Trachypterus tœnia, Bloch).
PLATE 123.—The Two-pronged Toad-fish (Chironectes bifurcatus, McCoy).
PLATE 124.—Brown's Tooth-brush Leather-jacket (Monacanthus Browni, Rich, sp.).
PLATE 125.—The Horse-shoe-marked Leather-jacket (Monacanthus hippocrepis, Quoy and Gaim., sp.).
PLATE 126.—Maplestonia cirrata (P. McG.).—Scrupocellaria cyclostoma (Busk).—S. obtecta (Haswell).—S. cervicornis (Busk).—S. scrupea (Busk).—S. ornithorhynchus (Wyv. Thom.).
PLATE 127.—Membranipora pyrula (Hincks).—M. corbula (Hincks).—M. inarmata (Hincks).—M. pectinata (P. McG.).—M. serrata (P. McG.).—M. ciliata (P. McG.).—Amphiblestrum albispinum (P. McG.).—Membranipora spinosa (Quoy and Gaim.).
PLATE 128.—Cellepora speciosa (P. McG.).—C. serratirostris (P. McG.).—C. tridenticulata (Busk).
PLATE 129.—The Netted Acripeza (Acripeza reticulata, Guérin).
PLATE 130.—The Broad-styled Mantis (Mantis latistylus, Serv.).

DECADE XIV.

PLATE 131.—The Southern, or Blotched, Blue-tongued Lizard (Cyclodus nigroluteus, Quoy and Gaim. sp.).
PLATE 132.—The Thick-tailed Gecko (Phyllurus Miliusii, Bory).—The Marbled Gecko (Diplodactylus marmoratus, Gray).
PLATE 133.—Ray's Sea Bream (Brama Rayi, Bloch).
PLATE 134.—Bleeker's Parrot-fish (Labrichthys Bleekeri, Cast.).
PLATE 135.—The Black-finned Half-beak, or Sea Gar-fish (Hemiramphus intermedius, Cant.).—The Saury Pike (Scomberesox saurus, Bloch, sp.; var. Forsteri, Cuv. and Val.).
PLATE 136.—Caberea rudis (Busk).—C. grandis (Hincks).—Canda arachnoides (Lamx.).—C. tenuis (P. McG.).
PLATE 137.—Caberea Darwinii (Busk).—C. glabra (P. McG.)—Ætea dilatata (Busk).—Æ. anguina (Linn. sp.).
PLATE 138.—Schizoporella punctigera (P. McG.).—S. lata (P. McG.).—S. triangula (Hincks).—S. dædala (P. McG.).—S. subsinuata (Hincks).—S. Ridleyi (P. McG.).—S. arachnoides (P. McG.).—S. cryptostoma (P. McG.).—Gemellipora striatula (Smitt).
PLATE 139.—The Dusky Flat-horned Locust (Opsomala sordida, Aud. Serv.). The Pedestrian Mid-Eyed Locust (Mesops pedestris, Erichson).
PLATE 140.—The Cinnamon Keel-backed Locust (Tropinotus Australis, Leach).

DECADE XV.

PLATE 141.—The Spiny-ridged Lizard (Egernia Cunninghami, Gray).
PLATE 142.—The Brown Pseudechys (Pseudechys Australis, Gray).
PLATE 143.—Peron's Leatherjacket (Monacanthus Peronii, Hollard).
PLATE 144.—The Spinous Shark (Echinorhinus spinosus, Lin. sp.).
PLATE 145.—Banks' Oar-Fish (Regalecus Banksi, Cuv. sp.)
PLATE 146.—Catenicella gemella (McG.).—C. urnula (McG.).—C. gracilenta (McG.).—C. venusta (McG.).—Claviporella pulchra (McG.).—C. imperforata (McG.).
PLATE 147.—Diastopora cristata (McG.).—D. capitata (McG.).—D. bicolor (McG.).—D. sarniensis (Norman).—D. patina (Lam. sp.).
PLATE 148.—Cellepora megasoma (McG.).—C. costata (McG.).—C. rota (McG.).—C. costazei, var. (Audouin).—C. platalea (McG.).—C. glomerata (McG.).—C. vitrea (McG.).—C. tiara (McG.).—C. benemunita (McG.).
PLATES 149, 150.—Southern Spiny Lobster, Melbourne Crawfish (Palinurus Lalandi, Lam. MSS.).

CONTENTS OF DECADE XV.

N.B.—The originals of all the Figures are in the National Museum, Melbourne.

PLATE 141.—The Spiny-ridged Lizard (Egernia Cunninghami, Gray).

PLATE 142.—The Brown Pseudechys (Pseudechys Australis, Gray).

PLATE 143.—Peron's Leatherjacket (Monacanthus Peronii, Hollard).

PLATE 144.—The Spinous Shark (Echinorhinus spinosus, Lin. sp.).

PLATE 145.—Banks' Oar-Fish (Regalecus Banksi, Cuv. sp.).

PLATE 146.—Catenicella gemella (McG.).—C. urnula (McG.).—C. gracilenta (McG.).—C. venusta (McG.).—Claviporella pulchra (McG.).—C. imperforata (McG.).

PLATE 147.—Diastopora cristata (McG.).—D. capitata (McG.).—D. bicolor (McG.).—D. sarniensis (Norman).—D. patina (Lam. sp.).

PLATE 148.—Cellepora megasoma (McG.).—C. costata (McG.).—C. rota (McG.).—C. costazei, var. (Audouin).—C. platalea (McG.).—C. glomerata (McG.).—C. vitrea (McG.)—C. tiara (McG.).—C. benemunita (McG.).

PLATES 149, 150.—Southern Spiny Lobster, Melbourne Crawfish (Palinurus Lalandi, Lam. MSS.).

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MARY D. ROGICK